Report on the

Sanitary Measures in India

1909-10 to 1915-16

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REPORT

ON

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IN

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CONTENTS.

REPORT.

	PAGE.
European Army—	
Sickness and mortality in 1909 ...	1
Fevers	2
Venereal diseases	2
Abscess of the liver; alcoholism ...	3
Other diseases	3
Invaliding	3
II. Native Army—	
Sickness and mortality in 1909 ...	4
Malaria	4
Pneumonia	5
Pyrexia of uncertain origin ...	5
Other diseases	5
Invaliding	5
III. General population:	
Meteorology and general conditions	6
Registration of vital statistics ...	6
Births and Deaths	6
Chief diseases	6
Vital statistics of Bengal ...	7
„ City and Port of Calcutta ...	7
„ Eastern Bengal and Assam ...	8
„ United Provinces ...	8
„ Punjab ...	8
„ North-West Frontier Province ...	9
„ Central Provinces and Berar ...	9
„ Madras ...	9
„ Madras City ...	9
„ Bombay ...	10
„ City and Port of Bombay ...	10
„ Burma ...	10
Red Sea Pilgrim Traffic ...	10
IV. Jails—	
Sickness and mortality in 1909 ...	11
Chief diseases	11
Bengal	11
Eastern Bengal and Assam ...	12
United Provinces	12
Punjab	12
North-West Frontier Province ...	12

	PAGE.
IV. Jails—*contd.*	
Central Provinces	12
Madras	12
Bombay	13
Burma	13
Andamans	13
V. Vaccination—	
General results	14
Bengal	14
Eastern Bengal and Assam ...	14
United Provinces	15
Punjab	15
North-West Frontier Province ...	15
Central Provinces and Berar ...	15
Madras	15
Bombay	15
Burma	15
VI. Medical Institutions—	
A—Civil Hospitals and Dispensaries (State, Public, Local Fund and Private-aided.)	
Institutions and Patients ...	16
Bengal	16
Calcutta	16
Eastern Bengal and Assam ...	17
United Provinces	17
Punjab	17
North-West Frontier Province ...	17
Central Provinces and Berar ...	17
Baluchistan	17
Madras	17
Bombay	18
Burma	18
B. Civil Hospitals and Dispensaries (State, Special, Railway and Private non-aided)	18
C. Lunatic Asylums—	
General	18
Bengal	19
Eastern Bengal and Assam ...	19
United Provinces	19
Punjab	19
Burma	19
Central Provinces	19
Bombay	19
Madras	19

CONTENTS—*contd.*

REPORT—*contd.*

	PAGE.
VI. Medical Institutions—*contd.*	
D. Medical Colleges and Schools—	
Bengal	19
United Provinces ...	20
Eastern Bengal and Assam	20
Burma	20
Punjab ...	20
Central India	20
Madras	20
Bombay	20
E. Institutes—	
X.-Ray Institute, Dehra Dun	21
Research Institutes ...	21
VII. Sanitation—	
Bengal	22
Calcutta City	22
Eastern Bengal and Assam	22
United Provinces ...	22
Punjab	22
North-West Frontier Province	22
Central Provinces and Berar	22
Madras	23
Madras City	23
Bombay ...	23
Bombay City ...	23
Burma ...	23

Abstract of the India Sanitary Report for 1909.

	PAGE.
Meteorology of the year	25
European troops	41
Native „	57
Jails of India	65
General Population	81
History of the chief diseases	91
Vaccination	105
Sanitary works	114
General remarks	121
Statistical Tables	132

REPORT.

The following Report on Sanitary Measures in India in 1909-10 is prepared for presentation to Parliament. It deals with the health of the European and Native troops, of prisoners in jails, and of the general population; also with vaccination, medical institutions including hospitals, dispensaries and medical schools, with lunatic asylums and with sanitation.

I.—EUROPEAN ARMY.

Sickness and mortality.—Notwithstanding a legacy of chronic malaria left from the previous year, the health of the European troops in India during 1909 was exceptionally good. The rates of admission to hospital, of constantly sick, of mortality and of invaliding were all much lower than those ever recorded among the European Army in India, and it is noteworthy that every chief disease, except influenza, shared in the decrease of sickness. On an average strength of 71,556, the admissions to hospital were in the ratio of 716·9 per 1,000 against 839·5 in 1908 and 879·4 for the antecedent quinquennium. The constantly sick rate fell from 45·7 in 1908 to 40·3 in 1909; the death rate from 9·78 to 6·25 and the invaliding rate from 15·64 to 9·07. The causes of the present very low rates of sickness, death and invaliding are discussed in the abstract of the report of the Sanitary Commissioner with the Government of India printed in this volume, and special attention is drawn to the view that measures of personal or individual hygiene have been a factor of great importance.

The following table shows the rate of sickness, mortality and invaliding among European troops in the Northern and Southern Armies and in India as a whole during 1909 and 1908:—

Armies.		Average annual strength.	Ratio per 1,000 of average annual strength.				
			Admissions.	Constantly sick.	Deaths.	Invaliding.	Total loss.
Northern	1909	37,995	775	43	6·97	10	17
	1908	36,676	939	49	10·72	16	27
Southern	1909	31,426	661	40	5·66	9	15
	1908	30,243	724	44	7·51	16	24
India	1909	71,556	717	40	6·25	9	15
	1908	68,933	840	46	9·78	16	26

The greater amount of sickness and mortality in the Northern Army is noteworthy, and nearly all the chief diseases, except venereal diseases, contributed to this result. The health of the troops in the Quetta, Poona and Rawalpindi Divisions was better than in the other Divisions during 1909.

The following table shows the sickness and mortality among the European troops according to geographical groups:—

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands	1,311	881	51	6·10
Burma Inland	1,868	756	35	6·42
Bengal and Orissa	1,856	643	40	7·00
Gangetic Plain and Chutia Nagpur	6,167	740	43	7·13
Upper Sub-Himalaya	13,585	869	45	6·92
North-West Frontier, Indus Valley and North-West Rajputana.	5,027	991	46	10·34
South-East Rajputana, Central India and Gujarat	5,950	906	44	5·88
Deccan	10,149	489	28	5·12
Western Coast	1,402	727	54	7·85
Southern India	3,612	676	49	6·09
Hill Stations	12,586	513	31	4·37
Hill Convalescent Depôts and Sanitaria	4,186	785	69	7·64
India	71,556	717	40	6·25

Of the above twelve groups, the admission rates recorded in eight were higher than those recorded for the European Army as a whole. As in other years, the North-West Frontier and Indus Valley was the most unhealthy group. As regards cantonments, only 12 were regarded as especially unhealthy during 1909 as compared with 22 in the previous year.

Fevers.—The admission rate from malaria fell from 244 per thousand in 1908 to 203 in 1909. The latter figure is higher than that for 1907, but this is not because the year under report was more malarious than 1907, but because a large number of soldiers who had contracted malaria in the very unhealthy autumn of 1908 continued to suffer frequently from relapses during the early part of the following year. This is evident from the following tabular statement :—

Annual admission rates per 1,000, from malaria, by months.

—	—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1908 ...	Admissions to hospital.	76·8	55·2	62·4	73·2	98·4	117·6	145·2	259·2	588·0	693·6	481·2	274·8
1909 ...		180·0	92·4	124·8	163·2	195·6	207·6	266·4	278·4	261·6	260·4	241·2	156·0
1908 ...	Treated in barracks.	33·5	22·7	28·1	28·8	32·4	45·9	56·7	59·7	206·4	256·7	241·3	157·4
1909 ...		109·1	75·8	69·6	86·3	109·7	106·8	100·6	101·7	103·1	116·7	107·4	71·2

On account of the prevalence of relapses curative measures held a very important part during 1909 in the campaign against malaria, and it was therefore of great advantage to the troops that a careful system of "after-treatment" is now adopted at all stations. The measures taken to prevent new infections were of the same kind as in recent years, but the good results attending measures classed under the heading "prophylaxis for the individual" are becoming more widely recognised and applied.

The admissions for *enteric fever* were 639 or 8·9 per thousand of strength, as against 1,001 or 14·5 per thousand in 1908, and the deaths were 113 against 190, or a death rate of 1·58 against 2·76. The admission rate was lower than in any year since 1883 and the death rate was lower than in any year since 1875. The average number constantly sick was less by about 37 than in 1908, and the total loss of service was less by 13,730 days. A further remarkable feature of the statistics was the much lower case mortality. Among 7,635 cases during the years from 1898 to 1902 the fatality was 23·4 per cent, and among 6,955 cases during 1903 to 1907 it was 17·1. In 1908 it was 17 per cent and in 1909 only 14 per cent. The causes of the remarkable decline of enteric fever are discussed in full on pages 47 to 52 of this volume.

Only one admission to hospital during 1909 was due to *Malta fever* as compared with three in 1908 ; but there were five cases of *kala-azar* with two deaths as compared with four cases and one death in that year.

Venereal diseases.—Venereal diseases were the cause of 9·46 per cent of the total sickness during 1909, and of 5·24 per cent of invaliding in the European Army. The difference in the incidence upon troops serving in the north and south of India was less marked than usual during 1909. This is due to a slightly higher admission rate among troops in the Northern Army and to an appreciable decrease of the admission rate among those in the Southern Army. As usual the admission rates were highest among the troops in the Burma and Secunderabad Divisions. The causes to which the rapid and steady fall in the rates relating to these diseases are usually, and with good reason, attributed, have been detailed in previous issues of this report. This year attention is directed by the Sanitary Commissioner to the more general application of the principles of personal hygiene and to the decreased indulgence in alcohol as factors of great importance in the reduction of these diseases.

Abscess of the liver; alcoholism.—The marginal statement shows the total admissions to hospital and deaths from hepatic abscess in each of the last four years. The decrease is the more remarkable as the prevalence of dysentery, which is a very common antecedent of abscess of the liver in India, remains about the same as it was a number of years ago. It is coincident, however, with a remarkable and steady decline in the number of admissions to hospital from alcoholism. In 1909 there were only 65 admissions from that cause as compared with 71 in 1908, 94 in 1907, 170 in 1906, 197 in 1905, and an annual mean of 231 for the years from 1900 to 1904.

	Abscess of liver.	
	Admissions.	Deaths.
1906	183	107
1907	165	70
1908	115	55
1909	100	34

Other diseases.—*Cholera* caused only twelve admissions to hospital and seven deaths as compared with 93 admissions and 76 deaths in 1908, and of *small-pox* there were only 19 cases as compared with 53. The only fatal case of this disease occurred at Fort William (Calcutta), where a conductor in the Indian Ordnance Department who had been revaccinated 26 years previously died from the confluent type of the disease. The admission and death rates from dysentery fell from 14·4 and ·42 per 1,000 in 1908 to 11·2 and ·25 in 1909. The death rate was twice as high in the Northern as in the Southern Army. The disease was most prevalent among troops in the Poona, Lucknow and Secunderabad divisions, and as usual, among geographical groups, the highest admission rate was recorded in the Southern India Group (XI). There were five cases of *plague* with one death in 1909 as compared with two admissions and one death in 1908. Deaths from heat stroke fell from 37 in 1908 to 15 in 1909.

Invaliding.—From the European Army of India 649 men were invalided in 1909 (9·07 per thousand of strength) as compared with 1,078 (15·64 per thousand) in the previous year. In the Northern Army the rate was 9·97 per thousand and in the Southern Army it was 8·59 per thousand. The practice of sending men, who a few years ago would have been invalided to England, to hill stations in India has been one of the chief factors in reducing the invaliding rate among European troops. As a result of the very unhealthly autumn of 1908 malaria was the chief cause of invaliding during 1909. Of the total number of men invalided, 84 per cent were under 30 years of age and 74 per cent had been less than five years in India.

II.—NATIVE ARMY.

Sickness and mortality in 1909.—The health of the Native Army during 1909 was very good, all the rates being the lowest on record.

The following table shows the rates of sickness and mortality in 1909 and 1908:—

Armies.		Average strength.	Ratio per 1,000 of average strength.		
			Admissions.	Constantly sick.	Deaths.
Northern Army	1909	64,544	666	23	6·72
	1908	62,141	797	26	8·69
Southern Army	1909	53,470	545	20	5·27
	1908	50,822	599	21	6·30
India	1909	1,31,627	584	21	5·62
	1908	1,26,975	674	23	7·41

The admission, constantly sick and death rates were all higher in the Northern than in the Southern Army.

The following statement gives the principal statistics of the Native Army arranged in geographical groups, for 1909:—

Groups.	Average strength.	Ratio per 1,000 of average strength.		
		Admissions.	Constantly sick.	Deaths.
Burma Coast and Bay Islands	1,419	727	24	7·05
Burma Inland	2,887	653	23	3·46
Assam	961	983	32	3·12
Bengal and Orissa	2,227	475	19	4·04
Gangetic Plain and Chutia Nagpur	6,712	691	21	5·66
Upper Sub-Himalaya	21,280	547	21	7·57
North-West Frontier, Indus Valley and North-Western Rajputana	18,853	1,014	29	6·74
South-Eastern Rajputana, Central India and Gujarat	11,979	607	20	3·76
Deccan	18,638	455	18	3·76
Western Coast	1,787	793	31	6·72
Southern India	5,437	455	18	5·52
Hill Stations	24,735	481	20	7·77
India	1,31,627	584	21	5·62

The chief causes of sickness were malaria, dysentery, pyrexia of uncertain origin and respiratory diseases, in order of their relative prevalence; while pneumonia, enteric fever and tubercle of the lungs were the chief causes of mortality.

In seven of the twelve groups the constantly sick rate was higher than that for the whole Native Army, and in six the mortality was greater. As in 1908, the North-West Frontier and Western Coast groups must be considered to have been for Native troops more unhealthy than the other areas, and again as in 1908, the highest death rate was recorded in the Hill Station group, where pneumonia was the chief cause of death. In Edwardesabad the admission rate was 1,562 per thousand, in Dera Ismail Khan 1,479, Nowshera 1,029, Jubbulpore 1,011 and Peshawar 926, malaria being the chief cause in each case.

Malaria.—As usual malaria accounted for about one-third of the sickness in the Native Army during 1909. The admission rate was 180 per thousand as compared with 266 in 1908. The continuous decline in the rate is satisfactory, but as stated in previous reports little or no value can be placed on the statistics as an indication of the true prevalence of this disease owing to the practice of treating native soldiers

suffering from malaria as out-patients, and to the uncertainty as to how far exactly this system prevails.

Pneumonia.—Although pneumonia was less prevalent than in 1908, it was again the chief cause of death in the Native Army, and contributed 34 per cent of the total deaths, the death rate being 1·88 per thousand of the average strength as against 2·20 in 1908. The death rate from this disease was a little more than six times as great as that among European troops. The disease is more prevalent and fatal in the hill stations between three and five thousand feet above sea level than in those above the latter height.

Pyrexia of uncertain origin.—This heading appeared for the first time in the returns for 1908. To a great extent it has been used as a substitute for the heading "simple continued fever," but in the statistics for Native troops it includes a wider range of diseases than in those of European troops; and some of the diseases are of a more serious type. In 1909 there were recorded under the heading 2,925 admissions to hospital and 17 deaths as compared with 4,386 admissions and only one death in the European Army.

Other diseases.—Cholera was much less prevalent than in 1908, only 26 cases and 18 deaths being reported as compared with 174 and 116 in that year, and only ten regiments located in nine stations being affected as compared with 50 regiments located in 29 stations in 1908. *Small-pox* caused 43 admissions to hospital as against 103 during 1908, but the number of deaths was eight as compared with three. There were 284 admissions with 57 deaths from *enteric fever* as against 350 and 73 respectively recorded in 1908. The admission rate from *tubercle of the lungs* fell from 3·0 per 1,000 in 1908 to 2·3 in 1909, and the death rate from ·42 to ·39. *Dysentery* was less prevalent than in 1908, and the number of deaths was only 19 as compared with 28. Among the general population of India there was an increase of *plague* in 1909, but the number of cases among Native troops fell from 36 in 1908 to 16, and the deaths from 14 to 8. The improvement noted last year in the venereal statistics of Gurkhas was not maintained during the year under report, the admission rate among them rising from 18·2 per thousand to 21.

Invaliding.—The number of men invalided for discharge from the service was 756 as compared with 842 in 1908, the chief causes of this source of loss being tubercle of the lungs, debility, malaria, and injuries.

III.—GENERAL POPULATION.

Meteorology and general conditions.—On the whole the rainfall of the year 1909 was more abundant than usual, the total precipitation on the plains of India being above normal by 2·1″ or 5 per cent. The excess was fairly general and was almost as large in amount in the dry zone of the Punjab and Rajputana as in Burma and Bengal. The deficiency was restricted almost entirely to Assam, Baluchistan and the central part of the country; and in no sub-division did it exceed 16 per cent in amount. The crops were nearly everywhere abundant, and the public health, as indicated by the diminished death rates, improved greatly.

Registration of vital statistics.—The populations among which births and deaths were registered in 1909 numbered 226, 394, 326.

Births and deaths.—The mean birth rate for the year was 36·65 per thousand of the population compared with 37·78 in the preceding year and a quinquennial mean of 38·64. The most serious decrease took place in the Punjab, the United Provinces and Ajmer-Merwara where the people suffered most severely from the epidemic of malaria which occurred in the autumn of 1908.

In all provinces, however, except the United Provinces, Coorg and Ajmer-Merwara the birth rates were higher than the death rates, the excess being much higher than elsewhere in the Central Provinces and Madras. The mean death rate was 30·91 compared with 38·21 in 1908 and 35·79 for the quinquennium. The rates ranged from 50·94 in Ajmer-Merwara to 21·8 in Madras, and in all provinces except Eastern Bengal, Bombay, Upper Burma and Ajmer-Merwara the death rates in 1909 were lower than in the previous year, and in most provinces the reduction was very large.

Chief diseases.—The number of deaths from cholera recorded in British territory in India during 1909 was 239,281, equal to a death rate of 1·5 per thousand of the total population under registration. The number was considerably less than half the number recorded in 1908, every province except Bombay, Eastern Bengal and Assam and Upper Burma sharing in the decrease. In Bengal, the United Provinces, and the Madras Presidency, where the disease was severely epidemic during 1908, the decline in prevalence was remarkable, the deaths in those three provinces amounting to only about 118,000 as compared with nearly 500,000 in the previous year.

The death rate from *small-pox* fell from ·75 per thousand of population in 1908 to ·45 in 1909. The latter was also the mean ratio for the quinquennial period from 1904 to 1908. The total number of deaths was 101,152 against 170,694 in 1908 and 103,988 in 1907. The death rates were lower than in 1908 in all provinces except Bengal, Eastern Bengal and Assam, and the Bombay Presidency, the decrease, as regards the chief provinces, being greatest in the Punjab.

The mean death rate from *plague* in the British provinces was ·64 per thousand against ·50 in 1908 and 5·16 in 1907. As compared with 1908 the prevalence of the disease increased in the United Provinces, the Punjab, the Central Provinces, the Madras Presidency, Upper Burma and Ajmer-Merwara. In the City of Calcutta the mortality from this disease rose from 1,779 to 2,117 and in Bombay it fell from 5,348 to 5,186. In Madras three deaths were recorded as compared with two in 1908.

In 1909 the number of deaths from "*fevers*" was 4,487,492 and the rate 19·82. The decline as compared with the abnormal year of 1908, when the number was nearly 5½ millions and the rate 23·96, occurred chiefly in the figures for the last four months of the year, but there was some decline in every month except February and March. Judging from the indications afforded by the statistics of troops the rise in those months was probably a result of the severe malaria epidemic that swept over the upper provinces of India in the autumn of 1908, and the fact that the rise was almost entirely in the United Provinces and the Punjab supports this view. The number of deaths recorded under the heading *dysentery and diarrhœa* was lower than in any year since 1898 and the recorded death rate was only ·96 per thousand as compared with 1·26 in 1908.

The deaths from the chief diseases and from all causes in the several provinces in 1909 were as follows :—

Province.	Cholera.		Small-pox.		Fever.		Dysentery and Diarrhœa.		Plague.		Respiratory Diseases.		Deaths from all causes.		
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000. 1909.	Ratio per 1,000. 1908.
Bengal	56,711	1·12	38,609	·76	1,056,237	20·90	35,981	·71	11,779	·23	15,071	·29	1 543,971	30·55	38·56
Eastern Bengal and Assam.	71,737	2·40	23,604	·79	732,488	24·56	26,171	·87	1	·00003	4,721	·15	1,010,355	33·89	30·74
United Provinces ...	21,823	·46	5,907	·12	1,475,570	30·94	14,260	·30	38,394	·80	16,386	·34	1,781,069	37·34	32·73
Punjab	1,513	0·08	3,352	0·17	410,273	20·40	10,416	0·52	35,655	1·77	44,664	2·22	621,083	30·89	50·73
North-West Frontier Province.	134	0·07	611	0·32	39,403	20·65	407	0·21	1	0·001	1,631	0·85	50,691	26·57	35·83
Central Provinces ...	7,687	0·64	4,155	0·35	180,544	15·08	33,386	2·79	19,216	1·61	31,090	2·60	396,135	33·09	38·08
Madras Presidency ...	39,424	1·1	18,862	0·5	268,408	7·3	48,176	1·3	3,844	0·1	28,299	0·8	801,566	21·8	26·2
Coorg	99	·55	6	·03	4,113	22·77	187	1·04	2	·01	959	·33	5,184	28·15	34·94
Bombay Presidency ...	28,714	1·55	5,019	·27	223,888	12·11	35,039	1·90	24,359	1·32	53,433	2·89	505,936	27·38	27·15
Lower Burma ...	4,041	·73	834	·15	52,513	9·44	9,162	1·65	3,365	·61	5,625	1·01	154,009	27·70	28·06
Upper Burma ...	7,348	2·46	177	·06	28,246	9·47	3,235	1·08	3,581	1·20	2,154	·72	103,703	34·81	28·52
Ajmer-Merwara ...	...	...	16	·03	15,809	33·15	536	1·13	5,176	10·85	230	·48	24,292	50·94	40·03
India ...	239,231	1·05	101,152	·45	4,487,492	19·82	216,956	·96	145,333	·64	203,363	·90	6,998,044	30·91	38·82

The following remarks relate to separate provinces and cities—

Bengal.

The rainfall, except in the beginning and end of the year, was considerably in excess of the normal, particularly in Bengal proper and during the monsoon. The winter crops were poor, especially in Bihar, and the prices of food grains remained high until the early advent of the monsoon rainfall, which was on the whole well distributed, dispelled anxiety. Seasonable climatic conditions resulting in abundant water-supplies and comparatively cheap food produced a great improvement on the public health, and the general death rate which fell from 38·56 in 1908 to 30·55 was lower than it has been for 10 years. The birth rate rose from 36·09 in the previous year to 37·79.

The number of deaths recorded as due to cholera was 56,711 which is the lowest number since 1880. The death rate was only 1·12 per thousand of population as compared with 5·32 in the previous year. No district was entirely free from the disease but in every district except Bhagalpur its prevalence was much less than in 1908. The highest mortality was recorded in the Jessore district where the disease prevailed severely from March to May and again during November and December. The mortality from small-pox has increased each year since 1906, and in 1909 it rose to 38,609 as compared with 35,966 in 1908. Plague has been diminishing for several years and in 1909 the deaths recorded from it amounted to only 11,779, as compared with 15,948 in the previous year. The death rate recorded under the heading "fever" fell from 23·18 in 1907 and 23·44 in 1908 to only 20·90, the total number of deaths being less by 128,467 than in the previous year. The death rate from dysentery and diarrhœa was ·71 per thousand as compared with 1·28 in 1908.

City and port of Calcutta.

The registration of births in Calcutta City has greatly improved and the total number of births registered during 1909 was 19,423, as against the previous highest total of 17,043 registered in 1908. These give a rate of 22·9 and 20·1, respectively per thousand on the census population of 1901. The death rate, calculated on the census population was 34·1 per thousand as against 32·6 in 1908, but notwithstanding this increase, the health of the City is considered to have been good. The infantile mortality rate was the lowest on record for 18 years, *viz.*, 268 per thousand births registered. More than half the deaths of infants occurred before the age of one month, and 37 per cent died under seven days of age. A severe outbreak of small-pox occurred during the early part of the year and the total number of deaths from this disease was 3,784, giving a death rate of 4·4 per thousand. There were 2,022 deaths from cholera as compared with 3,694 in 1908 and 2,117 deaths from plague as compared with 1,779.

About 21,620 European seamen arrived in the Port of Calcutta during 1909 as against 23,434 in 1908, and the daily average population was 1,130. There were 69 deaths. The average native floating population, which is estimated at 29,768, furnished 193 deaths or 60 less than in 1908, the ratio per thousand being 6·48.

Eastern Bengal and Assam. The monsoon rains were abundant and well distributed, and the high prices of food grains fell considerably. The general health was, however, poor. The birth rate fell from 41·14 in 1908 to 40·46 per thousand, the death rate rose from 30·74 in 1908 to 33·89, which is considerably in excess of the quinquennial mean of 31·77. On tea gardens the birth rate was 25·8 per thousand compared with 22·7 in 1908, and the death rate decreased from 34·3 to 28·4. The rural death rate was 34·11 per thousand compared with 23·70 in the towns.

The number of deaths attributed to cholera during 1909 was 71,737, equal to a ratio of 2·40 per thousand of the population, as compared with 59,329 deaths or a ratio of 1·99 in 1908. The curve of monthly deaths showed a double rise, the first during March, April and May, the second during October to December. These epidemic rises indicate for this province the usual seasonal incidence of the disease, which is thought to depend upon the rise and fall of the great rivers. The deaths of 23,604 persons were attributed to small-pox during 1909, as compared with only 9,373 during 1908, the ratios per thousand of the population for the two years being ·79 and ·31, respectively. It is said that the increased prevalence was due to the constant importation of cases from Calcutta. The districts chiefly affected were Rangpur, Bogra, Nowgong, Darrang and Dinajpur. The province remained free from indigenous plague during 1909 and only two imported cases were reported. The Plague Research Commission has begun to investigate the problem of the immunity of this province from the epidemic. There were 732,488 deaths from fever as compared with 667,146 in 1908, the death rate rising from 22·37 to 24·56. The province was one of the three in all India in which the mortality recorded under dysentery and diarrhœa was higher than in 1908. The death rate rose from ·83 to ·87 per thousand, all except eight of the districts contributing to the increase.

United Provinces. The rainfall of the year was considerably in excess of the normal. The monsoon burst early and the rain was well distributed. The prices of food grains, though still high, were considerably less than in 1908. The fall in the birth rate from 37·46 per thousand in 1908 to 33·32 was due to the malarious autumn of 1908. The death rate fell from 52·37 per thousand in 1908 to 37·34 in 1909, and was 5·45 per thousand lower than the quinquennial mean. This, however, is misleading as an indication of the public health, not only because of the unusually low birth rate of 1909 but also because large numbers of weakly and elderly persons died during the malaria epidemic of 1908. Moreover in nine districts the general mortality was higher than in the preceding year.

Cholera was less prevalent than in 1908. There were only 5,907 deaths recorded from small-pox against 59,996 in 1908, the death rate being only ·12 per thousand against 1·26. Eight districts were free from the disease and in 20 others the number of deaths did not exceed ten. Plague accounted for 38,394 deaths in 1909 against 22,878 in the previous year. The figures give death rates of ·80 and ·48 per thousand, respectively. The deaths recorded as due to fever were considerably more than might have been expected in a year like 1909 when the conditions in these provinces were, on the whole, very favourable. They numbered 1,475,570, equal to a death rate of 30·94 per thousand as compared with a mean rate of 26·88 for the quinquennium ending with 1907. In comparison with the monthly figures of ordinary years there was a considerable increase from January to April and this may be attributed to the effects of the autumnal epidemic of malaria in 1908.

Punjab. Climatic conditions were favourable, the prices of food grains were comparatively low, and there was so great a demand for labour in the Canal Colonies that wages were generally high. The ill-effects of the epidemic of malaria are apparent in the low birth rate, only 705,910 births were recorded equal to a rate of 35·1 per thousand, compared with 41·8 in 1908, and a quinquennial mean of 42·4. The number of deaths recorded totalled 621,083, and the death rate was 30·9 per thousand, nearly 20 per thousand lower than in 1908 and 18·4 per thousand less than the five years' mean. The low death rate was attributable to the great diminution in the prevalence of fever and the comparative freedom of the province from plague, for, although cases were more numerous than in 1908, their number was inconsiderable in comparison with those recorded in the epidemic years of the quinquennium. The district death rates ranged from 39·6 per thousand in Delhi to 23·9 in Jullundur. In rural areas the mean death rate was 30·48 per thousand compared with 34·62 in the towns.

There were only 1,513 deaths from cholera and 3,352 from small-pox, as compared with 12,297 and 28,652, respectively, in 1908. The number of deaths attributed to

plague during 1909 was 35,655 or a ratio of 1·77 per thousand as compared with a total of 30,708 and a ratio of 1·53 in 1908. An important feature of the seasonal incidence was the unusually high mortality during the last four months of the year. The number of deaths from dysentery and diarrhœa fell from 21,103 in 1908 to 10,416, this number being the lowest on record for the province. In the autumn of 1908 the Punjab was visited by an unusually severe epidemic of malaria the effects of which were apparent in the mortality returns for the first few months of 1909. Afterwards, however, the mortality from fevers was not excessive and for the whole year the death rate was only 20·40 per thousand as compared with 34·66 in 1908 and 20·16 in 1907. The total number of deaths recorded under this heading was 410,273 which is 66 per cent of all the deaths recorded.

North-West Frontier Province.

The rainfall, which was in defect during the first half of the year, was ample and well distributed during the season of the monsoon, and average, or more than average crops on a considerably extended area of cultivation lowered the prices of food grains and raised the rate of wages. The birth rate owing to the malarious autumn of 1908, was lower than usual and fell from 37·3 in 1908 to 34·7. The death rate (26·6) was more than 6 per thousand below the quinquennial mean. There were only 134 deaths from cholera as compared with 2,845 in 1908. The number of deaths recorded as due to small-pox was 611 (·32 per thousand) of the population as compared with 734 (·38 per thousand) in 1908. The province was entirely free from indigenous plague and there were only four imported cases, one of which was fatal. The deaths recorded from fevers numbered 39,403 as compared with 50,795 during 1908. The greatest number of deaths under this heading were recorded in January. The autumn was unusually healthy.

Central Provinces.

During the hot weather months and autumn the rainfall was in excess; during January and February and in the monsoon period it was in considerable defect, but as the rain was generally well distributed and seasonable, the crops were good and food supplies ample. The year was an unusually healthy one, and the death rate which fell from 38·12 per thousand in 1908 to 33·09 was 5·58 per thousand less than the five years' mean, and the lowest recorded since 1905. The birth rate fell slightly from 52·84 in 1908 to 51·63 per thousand owing to some scarcity in 1908 in the northern districts of the province.

Cholera, small-pox, fevers and bowel complaints were all less prevalent than usual. The number of deaths from plague was three times as many as in 1908, and gave a death rate of 1·61 per thousand compared with ·52 in the previous year. The decline in the mortality from fever was shared by all except two of the 24 districts of the province, and all except three shared in the decrease in dysentery and diarrhœa.

Madras.

In consequence of the failure of the north-east monsoon rains in 1908 the high prices of food grains were maintained in 1909, and although the south-west monsoon rainfall was ample, and the crops abundant, prices did not fall. The north-east monsoon in 1909 failed entirely. The general health in the presidency was good, the birth rate (33·1 per thousand) was the highest on record, and owing to cholera and fevers being less prevalent than usual, the death rate, which fell from 26·2 in 1908 to 21·8 per thousand, was considerably less than the quenquennial mean. The mean percentage of male to female births was 104·5, and calculated on the numbers born during the year the death rate of male infants was 184 per thousand and of female infants 162·8.

The number of deaths from cholera fell from 141,970 in 1908 to 39,424, and were in a ratio of 1·1 per thousand as against 3·9 in the previous year. In this presidency cholera is as a rule most prevalent during the monsoons from June to December, but in 1909, the rainfall was unusually heavy from January to March, and these were also the months in which cholera was most prevalent. Small-pox accounted for 18,862 deaths (·5 per thousand of population) against 22,204 (·6 per thousand) in 1908. Indigenous cases of plague were reported from only 7 of the 23 districts but the number of deaths rose from 3,358 in 1908 to 3,844. Deaths from fever were in a ratio of only 7·3 per thousand which is much lower than in any other of the chief provinces.

Madras City.

The birth rate in Madras City fell from 39·2 per thousand in 1908 to 37·2, and the death rate from 43·7 to 37·9, which is considerably below the quinquennial mean of 45·5. Dysentery and diarrhœa accounted for the greatest number of deaths (3,701). The infantile mortality rate fell from 296·3 in 1908 to 295·0 per thousand in 1909.

Bombay. The rainfall which was generally in defect in the early part of the year, was in slight excess during the monsoon, except in the Deccan. The cold weather crops although sown over a larger area than usual yielded a poor return, but the *kharif* except in the east of the Karnatak and of the Deccan was good and prices were normal except in Bijapur, Kanara and Panch Mahals. The birth rate (35·59 per thousand) was very slightly lower than the rate recorded in 1908 (35·72) and was 1·44 per thousand higher than the five years' mean. In all but three districts the recorded birth rates were higher than the death rates, the excess for the whole province being at the rate of 8·21 per thousand. There were recorded as due to cholera 28,714 deaths, equal to a ratio of 1·55 per thousand of the population, as compared with only 1,759 deaths or a ratio of ·09 in 1908. The disease was most prevalent from April until the end of August, nearly 90 per cent of all the deaths occurring during those months. The widespread character of the epidemic is shown by the fact that deaths from the disease were recorded in 218 of the 270 registration circles in the collectorates affected.

The death rate from small-pox rose from ·14 in 1908 to ·27 per thousand. The number of deaths from plague (24,319) was the lowest on record since the epidemic became established, and the mortality from fever was 223,888 against 243,372 in 1908. The number is the lowest recorded since 1898.

City of Bombay. The birth rate in Bombay City fell from 20·62 in 1908 to 20·28 per thousand in 1909, and the death rate from 39·13 to 35·66. Deaths from plague numbered 5,197 as against 5,361 in 1908, and there was lower mortality from all the principal causes, except cholera, tubercle and diseases of the nervous system.

Burma. The rainfall in the earlier part of the year was irregularly distributed, and the last three months were distinguished by an unusually heavy rainfall, but the monsoon rains were abundant and timely, and the crops were excellent throughout the year, the prices of the staple grain in all parts of the country being much lower than in 1908. The general health as indicated by the mortality was not particularly good. In lower Burma, the birth rate rose from 34·06 per thousand in 1908 to 35·27 and was 2·05 higher than the five years' mean. The death rate fell from 28·06 per thousand in 1908 to 27·70, which is 1·85 per thousand higher than the quinquennial mean, and may be accounted for by improved registration. In Upper Burma the birth rate was 37·10 per thousand compared with 36·32 in 1908, and the death rate 34·81 compared with 28·52. Registration of births in this area is still very defective.

There were 4,041 deaths recorded in Lower Burma and 7,348 in Upper Burma as due to cholera compared with 9,336, and 2,575, respectively, in the previous year. In Lower Burma the districts of the Irrawaddy Division were chiefly affected and every district was affected in Upper Burma. Only 1,011 deaths from small-pox were reported during 1909 against 1,298 during the previous year, 2,882 during 1907 and 8,540 during 1906. In Lower Burma the number of deaths attributed to plague fell from 5,169 in 1908 to 3,365, but in Upper Burma the number rose from 1,583 to 3,581. In both areas the disease was most prevalent from January to March. The towns in which most deaths occurred were Mandalay, Moulmein, Rangoon, Prome and Toungoo.. In several areas a vigorous sanitary campaign which included the demolition of buildings affording shelter to rats was carried out. In Lower Burma the death rate from fevers in 1909 was 9·44 per thousand as compared with 9·63 in 1908 and in Upper Burma it was 9·47 as compared with 8·23.

Red Sea Pilgrim Traffic. No change has been made since 1906 in the orders under which pilgrimage to the Hedjaz is permitted. Twenty-one ships carrying 16,097 pilgrims sailed during the year. The vessels were thoroughly cleansed and freed from rats by the Clayton process, the pilgrims were medically inspected before embarkation and their clothing and bedding thoroughly disinfected. The casualties which occurred between Bombay and Camaran numbered 114, the causes of death being registered at the latter place as generally due to malaria, senile debility, pneumonia and dysentery. The Indian pilgrims returned to Bombay in 24 vessels, carrying 14,330 pilgrims. There were 279 deaths on the homeward voyage due chiefly to old age, general debility, small-pox, dysentery, diarrhœa and privation.

IV.—JAILS.

Sickness and mortality in 1909.—The mean daily number of prisoners in the jails of India and Burma (excluding the Andamans) fell from 101,336 in 1908 to 99,104 in 1909, and the rates of admission to hospital and of constantly sick from 646 and 29 to 618 and 28 per thousand respectively. The death rate was 22·85 as compared with 24·17 in the previous year. Although in all provinces except Burma, the Punjab and the North-West Frontier the death rates were lower than in 1908, they were high compared with recent experience.

The following statement shows the sickness and mortality among all classes of prisoners in the jails of the various provinces for 1909 as compared with 1908.

Province.	1908.			1909.		
	Ratio per 1,000 of average strength.			Ratio per 1,000 of average strength.		
	Admissions.	Constantly sick.	Deaths.	Admissions.	Constantly sick.	Deaths.
Burma	277	16	13·27	310	16	16·15
Eastern Bengal and Assam	917	37	31·89	899	37	29·97
Bengal	930	38	31·61	916	40	25·13
United Provinces of Agra and Oudh ...	679	31	24·09	574	28	23·79
Punjab	581	26	23·49	613	28	25·16
North-West Frontier Province	1,222	37	15·61	1,021	27	20·68
Central Provinces and Berar	632	21	22·18	514	18	15·59
Bombay	654	33	18·16	580	28	17·92
Madras	443	23	29·80	497	25	25·24
India excluding Andamans	646	29	24·17	618	28	22·85

Chief diseases.—The diseases to which were due the greatest amount of sickness were malaria (admission rate 172·4 per thousand), dysentery (70·2), abscess, ulcer and boils (66·1), diarrhœa (38·6) and respiratory diseases (23·3) and the most common causes of death were dysentery (death rate 4·20 per thousand), tubercle of the lungs (3·72) and pneumonia (3·60). There was a decrease in the incidence of all diseases except pyrexia of uncertain origin, (in which doubtless many cases of malaria have been included), tubercle of the lungs, pneumonia and diarrhœa. The admission rate from malaria fell from 197·7 to 172·4 per thousand, the fall being common, although in widely differing degree, to all provinces except Bengal and Madras. The number of cases of dysentery fell from 7,796 to 6,959 and the number of deaths from 473 to 416. The most noticeable feature of the dysentery statistics are the enormously high admission and death rates in Eastern Bengal and Assam and Bengal, and the comparatively low admission rate and high death rate in Madras. Diarrhœa caused 3,822 admissions and 103 deaths as compared with 3,806 and 95 in 1908. Although the death rate for tubercle of the lungs fell slightly as compared with 1908, the admission rate was again unusually high (9·9 per thousand). The northern provinces which suffered from the epidemic of malaria in the autumn of 1908 returned abnormally high rates for this disease, manifesting the ill-effects of the unhealthy conditions of that epidemic. There was a considerable increase in the prevalence of pneumonia, the number of cases being 1,422 as compared with 1,259 in 1908 and 1,074 in 1907. The death rate also increased from 3·24 to 3·60 per thousand. There were 201 cases of cholera of which 111 terminated fatally, as compared with 337 and 170 respectively in 1908.

The number of prisoners admitted into jail fell from 101,000 to 89,081, but the average daily number in confinement rose from 15,565 to 16,036, which caused serious overcrowding, especially in the first seven months of the year. Twenty-three of the 37 jails were overcrowded throughout the year. Bengal.

The rate of admission to hospital continues to decline steadily, and was only 916 per thousand in 1909 as compared with 930 in 1908, 938 in 1907 and 1,009 in 1906. The constantly sick rate, however, was 40 per thousand—a higher figure than any recently recorded. Cholera was almost absent from the jails, but malaria was more prevalent and more deadly than in 1908. Tubercle was as frequent as in 1908 but less

fatal, and the death rate from pneumonia rose to 2·68 per thousand owing to an epidemic at Midnapore. Dysentery caused an admission rate of 151·5 per thousand and a death rate of 6·42, which although much lower than the high rate of 8·54 recorded in 1908 is considerably above the quinqennial mean.

Eastern Bengal and Assam. The average daily strength of the prison population rose from 7,118 to 7,173 and 12 of the 25 jails were overcrowded. In spite of the poor condition of the public health there was a slight improvement in the condition of the prisoners as compared with 1908, and although the constantly sick rate remained at 37 per thousand, the admission rate fell from 917 to 899, and the death rate from 31·89 to 29·97. Among the causes of death the more prominent were dysentery (death rate 8·09 per thousand), pneumonia (4·04), tubercle of the lungs (3·62) and malaria (2·79). As usual the death rate from diseases described as anæmia and debility was comparatively high.

United Provinces. The daily average number of prisoners fell from 28,308 to 26,020, and except in a few instances, the jails were not overcrowded. The ratio of admissions to hospital fell from 679 to 574 per thousand, and of constantly sick from 31 to 28, but disease was more deadly and the death rate was 23·79 or only ·30 per thousand less than in 1908. Cases of tubercle of the lungs were exceptionally numerous and fatal. Patients suffering from this disease are isolated in all jails, and the wards for open air treatment in the central prisons have been considerably enlarged. Pneumonia also was more frequent and much more fatal. Dysentery, although less prevalent than in 1908, was far more deadly, the death rate being 4·27 per thousand as against 3·89 in 1908.

Punjab. There was a slight increase in the available accommodation in the jails in the Punjab, and the average number of prisoners (11,526) was considerably below the quinquennial mean (12,333). Only six jails were temporarily overcrowded and in only one, the Lahore central jail, was the overcrowding serious. In spite of these favourable conditions, the rate of admisssion to hospital rose from 581 per thousand in 1908 to 613 in 1909, the constantly sick rate from 26 to 28, and the death rate from 23·49 to 25·16, which is considerably higher than any recently recorded in the province. The bad health of the prisoners is in marked contrast with the apparently healthy condition of the general population, but it was thought that the wave of prosperity induced by the seasonable rainfall of 1909 did not immediately reach the lower strata of the population and that in the province generally the low rates were due largely to the elimination of the unfit in the disastrous autumn of 1908, as well as to the moderation of the plague epidemic and the mildness of the autumnal malaria in 1909.

North West Frontier Province. The daily average strength of prisoners was 1,354, as compared with 1,345 in 1908. There was fairly constant overcrowding in the Peshawar jail for the greater part of the year, but the evil effects of this were minimised by the use of tents. The sickness was considerably less than in 1908, but the mortality was greater owing partly to the greater prevalence and fatality of tubercle of the lungs and dysentery. The number of cases of malaria fell from 905 in 1908 to 683 in 1909.

Central Provinces. The average daily number of prisoners rose from 4,013 to 4,297, a total, however, far below the number for which accommodation is provided. The admission rate fell from 632 in 1908 to 514, the constantly sick rate from 21 to 18, and the death rate from 22·18 to 15·59 per thousand. There was a notable decline in the mortality from tubercle of the lungs from 3·99 per thousand to 1·63. There were 127 cases of dysentery as compared with 181 in 1908, and the mortality fell from 5·23 to 3·72 per thousand. The number of admissions to hospital for malaria also showed a satisfactory decline.

Madras. The number of prisoners who passed through the jails was smaller than in 1908, but owing to sentences being generally more severe, the average daily number in confinement rose from 10,638 to the record number of 10,815, but nowhere was the overcrowding very serious. Although the death rate fell from 29·80 per thousand in 1908 to 25·24, the general health of the prisoners in most of the jails was not good, and the ratios of admission to hospital and constantly sick rose from 443 to 497 and from 23 to 25 per thousand respectively. Malaria and dysentery were the principal causes of sickness, and dysentery, cholera and tubercle of the lungs the principal causes of death. The admission rate from malaria was 81 per thousand compared with 72·9 in 1908, and from dysentery 69 compared with 64·1 in 1908. Cholera appeared in three jails and caused a death rate of 3·51 per thousand.

The daily average number of prisoners in confinement fell from 7,930 in 1908 to 7,591, and their health was generally good. The ratio of admissions to hospital fell from 654 per thousand in 1908 to 580 in 1909, the constantly sick rate from 33 to 28, and the death rate from 18·16 to 17·92. The number of cases of tubercle admitted to hospital fell from 52 to 28 and the death rate from 3·03 to 1·98. There were 99 cases of pneumonia as against 136 in 1908, and the death rate fell from 3·28 to 3·16. Dysentery was far less prevalent than usual, but the death rate was rather above the average. As usual, malaria was the principal cause of sickness; the admissions were nearly as many as in the preceding year and the death rate was slightly higher. **Bombay.**

The daily average number of prisoners in the jails was 13,680, compared with 13,871 in 1908. The general health of the prisoners was good, although the statistics are not so favourable as those of recent years. The ratio of admissions to hospital was 310 per thousand, compared with 277 in 1908 and 256 in 1907, and the constantly sick rate was 16, compared with 16 in 1908 and 14 in 1907. The death rate was 16·15 compared with 13·27 and 11·88 in the two preceding years. The increase in the death rate was largely due to an outbreak of cholera in the Mandalay jail, where there were 37 cases and 28 deaths. Cases of malaria are becoming progressively less frequent, and in 1909 the number fell to 486, giving a ratio of 35·5 per thousand. **Burma.**

The average strength of the convict population during 1909 was 13,145 as compared with 14,067 in 1908, and there was no overcrowding, except, as in the previous year, in the hospitals. The health of the Settlement was very bad, and among the prisoners the admission rate rose from 1,439 per thousand in 1908 to 1,761, and the constantly sick rate from 79 to 94, while the death rate, which has been comparatively low since 1906, rose to the high figure of 41·38. The salient feature of the unhealthiness of the year was the great prevalence and severity of malaria from March to September and of dysentery from May until the end of the year. The rate of admission to hospital from the former disease was 1,075 per thousand as compared with 856 in 1908 and from the latter 149 as compared with 111. The death rates from both diseases were more than double those of the preceding year. The type of dysentery differed from that which ordinarily occurs in the Settlement. **Andamans.**

V.—VACCINATION.

The total number of vaccinations performed during 1909-10 was 9,090,586 as compared with 9,123,362 in 1908-09. The decrease was, however, confined to four provinces. There were 8,096,233 primary cases and 994,353 re-vaccinations as against 8,161,297 and 962,065 respectively, in 1908-09. The percentage of success was also lower than in the preceding year, the ratios being 94·62 for primary operations and 66·58 for re-vaccinations as against 97·47 and 73·44 respectively in 1908-09. The proportion of the total population vaccinated was much the same as in 1908-09, *viz.*, 35·55 per thousand. About 44 per cent of the infantile population was successfully vaccinated during the year. The cost of the vaccination department increased by nearly £4,000, and the mean cost of each successful case works out to 3*d.*

The following statement shows the results of vaccination during the year 1909-10:—

Province.	Population among whom vaccination was carried out.	Number of operations performed (including re-vaccinations) by Special Department and Dispensary staff.	Ratio of successful vaccinations per 1,000 of population.	Number of children successfully vaccinated.		Percentage of annual estimated births at 40 per 1,000 of population, successfully vaccinated.
				Under one year of age.	Between one and six years of age.	
Bengal	48,492,815	2,053,773	40·30	934,181	810,879	48·16
Eastern Bengal and Assam ...	30,961,459	1,464,601	43·86	358,126	703,038	28·92
United Provinces of Agra and Oudh	47,960,667	1,390,961	27·45	776,878	400,039	40·50
Punjab	20,296,870	670,536	29·00	402,566	88,706	49·58
North-West Frontier Province ...	2,030,620	102,567	47·36	57,106	20,370	70·31
Central Provinces and Berar ...	13,601,341	609,606	42·27	416,269	99,231	76·51
Madras	38,227,818*	1,652,028	37·42	609,178	526,243	39·84
Coorg	180,607	11,971	56·77	706	4,131	9·77
Bombay	21,438,769	714,878	29·42	489,008	111,397	57·02
Burma	10,477,508	407,705	33·50	86,639	168,258	20·68
Ajmer-Merwara	476,912	11,960	24·34	* 9,111	2,297	47·76
Total ...	234,145,386	9,090,586	35·55	4,139,768	2,934,589	44·20

* Excludes the population of the Cantonments of Bangalore and Secunderabad.

Bengal. The number of primary operations performed during the year was 1,868,585 compared with 1,810,213 in the previous year, but the number of revaccinations fell from 209,318 to 185,188. The percentage of success in primary cases fell from 99·34 in 1908-09 to 98·97 in 1909-10, and the percentage of success in revaccinations rose from 61·78 to 63·26. The mean number of operations performed by each vaccinator was 1,083. Vaccination among infants continued to improve, nearly 50 per cent of this population being protected. Lanoline lymph was the most generally used, but the recorded percentage of success with it was slightly lower than with calf or human lymph.

Eastern Bengal & Assam. Owing chiefly to the prevalence of malarial fever not so many children were vaccinated during the year, and as compared with the previous year the number of primary vaccinations fell from 1,351,834 to 1,301,574. The number of revaccinations, however, increased by 62,051 and the net result was an increase of 12,341 operations. Glycerinated vaccine, prepared at the Shillong depôt, was used exclusively and gave on the whole very satisfactory results. The percentage of success in primary cases was 96·21 and in revaccinations 75·61 as against 98·76 and 74·26 respectively, in 1908-09.

Owing to the lower birth rate and the poor health of the children as a result of the malaria epidemic of 1908, the number of vaccinations fell from 1,456,785 in 1908-09 to 1,390,961 in 1909-10. Both classes of operations shared in the decrease. Lymph was obtained from the depôt at Patwa Dangar. The percentage of success in primary vaccinations rose from 96·49 per cent in 1908-09 to 97·56, and in revaccinations from 80·84 to 82 54. About 40 per cent of the infantile population was protected. **United Provinces.**

The number of operations performed during the year was 670,536, compared with 668,898 in 1908-09. The number of primary vaccinations increased by 5,260 but 3,622 fewer revaccinations were performed. The percentages of success declined from 98·43 to 97·58 in primary cases and from 76·93 to 74·32 in revaccinations. Nearly 50 per cent of the available infants were successfully vaccinated, and in towns in which the Vaccination Act is in force 79 per cent. of the children under one year of age were protected. There were 19,557 tubes of chloroformed glycerinated lymph issued from the Lahore Laboratory, from which 639,263 primary operations and 141,018 revaccinations were performed. The supply on the whole was satisfactory, but the percentage of success was slightly lower than in 1908-09 owing to a deterioration of stock in October and the early part of November through abnormally high temperature. **Punjab.**

There was a satisfactory increase of 11,199 operations during the year. The number of primary operations rose from 81,181 in 1908-09 to 94,701 but revaccinations fell from 10,207 to 7,886. Almost all the operations were performed with chloroformed glycerinated lymph. The percentage of success in both classes of operations was the same as last year, *viz.*, 98·67 and 82·76 respectively. All the districts of the province, except Hazara, contributed to the increase in the number of primary operations, and the number of revaccinations fell off mostly in the Kohat district. The benefits of vaccination are being appreciated even in trans-frontier districts. An outbreak of small-pox in and around Dir prompted the Nawab to ask for the services of a vaccinator and 480 persons were vaccinated. **North-West Frontier Province.**

The number of vaccinations performed during the year fell from 639,647 in 1908-09 to 609,606. This decline is attributed to various causes, including a low brith rate, extensive migration and plague. There were 535,697 primary operations compared with 553,438 in 1908-09, and it is estimated that 76·51 per cent of infants under one year of age were successfully vaccinated. Glycerinated calf lymph prepared at district head quarters was exclusively used with very good results, 99·15 per cent of the primary operations being successful as against 98·78 in the previous year. The cost of each successful case was estimated at less than 2*d*. **Central Provinces.**

Primary operations were fewer by 31,443 than in 1908-09, but the number of revaccinations rose from 170,634 to 204,700. The decline in the former is due to various causes, among them being epidemics of cholera and plague and the shortage in the staff owing to substitutes not being provided for those absent on leave. Estimating the birth rate at 40 per thousand 39·84 per cent of the available infants were successfully vaccinated compared with 40 98 in the previous year and in municipal towns the percentage protected fell from 68·7 in 1908-09 to 66·6. In Madras City glycerinated lymph was mostly used with success at the rate of 98·7 per cent. The efficiency of the lymph used was not so great as in 1908-09, partly owing to defect in storage, but mainly owing to local causes. **Madras.**

There were 665,602 primary vaccinations during the year, compared with 672,252 in the previous year. The decrease occurred chiefly in Sind, where increasing opposition to vaccination and greater difficulty in obtaining vaccinators is being encountered. Primary operations were successful at the rate of 98·96 per cent compared with 96·02 in 1908-09, and the number of children protected was 57·02 per cent as against 54·86. There was also a decrease of 3,464 revaccinations, but the rate of success was slightly higher than in 1908-09. In spite of the fact that the building of the Vaccine Institute was delayed, there was an increase in the outturn of gylcerinated lymph, and the success obtained with it was high. This lymph was used in about five of every seven operations and the rate of success was 99·22 per cent in primary operations. **Bombay.**

The number of operations preformed during the year was 407,705, made up of 353,616 primary operations and 54,089 revaccinations. The figures for 1908-09 were 342,977 primary oprations and 53,436 revaccinations respectively. In 25 districts there was an increase in the number of operations and in 15 a decrease. The provincial Vaccine Depôt supplied glycerinated lymph sufficient for 614,644 operations, and the quality was good, 95 per cent of the cases being successful. **Burma.**

VI.—MEDICAL INSTITUTIONS.

(This section is kindly contributed by the Director-General, Indian Medical Service.)

A. Civil Hospitals and Dispensaries (State, Local Fund and Private-aided).

The State, Local Fund and Private-aided hospitals and dispensaries in British India number 2,638, an increase of 60 on the figure for 1908. In every province there is need for more, but lack of funds prevents a more rapid growth of medical relief. The total expenditure amounted to £781,000, an increase of £93,000 on last year; but the subscriptions from Indians only amounted to £40,600. The extent to which hospitals are supported by the inhabitants varies very much in different parts of the country; in Bengal (excluding Calcutta) subscriptions from Indians amounted to £13,560 and covered nearly 20 per cent of the expenditure; on the other hand Madras only produced £2,000, or less than 1½ per cent, and Bombay only £1,000, or less than 1 per cent. There is no evidence of a decline in popularity of the existing hospitals; on the contrary the number of patients treated during the year, which was a healthy one, was 28,093,084, or nearly a million more than in 1908. Every province reports that women and female children are applying for assistance more freely than formerly; but the well-to-do continue to take advantage of the dispensaries as well, and thereby retard the growth of an independent medical profession outside big towns.

The following statement shows in tabular form the main features of the operation of these hospitals and dispensaries during the years 1908 and 1909:—

		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of Patients.	Number of Operations.
1. Eastern Bengal and Assam ...	1908	350	26,246	3,245,167	3,271,413	77,373
	1909	353	25,755	3,440,313	3,466,068	79,889
2. Bengal ...	1908	338	42,252	2,720,541	2,762,793	133,832
	1909	345	43,923	3,069,474	3,108,897	140,218
3. Calcutta ...	1908	15	25,780	290,960	316,740	32,786
	1909	15	25,207	302,949	328,156	33,909
4. United Provinces ...	1908	365	69,053	4,610,088	4,679,141	191,180
	1909	376	69,741	4,866,858	4,936,599	188,045
5. Punjab	1908	288	72,492	4,510,157	4,582,649	199,410
	1909	299	77,935	4,433,816	4,511,751	220,243
6. North-West Frontier Province ...	1908	45	10,198	654,763	664,961	25,344
	1909	49	11,304	688,492	699,796	29,100
7. Central Provinces ...	1908	165	13,415	1,717,867	1,731,282	44,671
	1909	166	13,776	1,765,284	1,779,060	44,307
8. Burma	1908	171	50,274	1,085,744	1,136,018	31,076
	1909	184	53,488	1,188,015	1,241,503	37,670
9. Madras	1908	495	73,911	5,296,431	5,370,342	194,659
	1909	501	75,795	5,469,623	5,545,418	211,216
10. Bombay	1908	322	53,089	2,149,852	2,202,941	82,044
	1909	325	51,673	2,198,538	2,250,211	84,143
11. Baluchistan	1908	24	4,208	206,699	210,917	4,981
	1909	25	3,867	221,758	225,625	5,391
Total ...	1908	2,578	440,928	264,88,269	26,929,197	1,017,356
	1909	2,638	452,464	27,640,620	28,093,084	1,074,131

Bengal. The year was a healthy one, and there were 128,557 fever cases of malarial fever; but the number of patients shows a considerable increase over that of 1908. The employment of Sub-Assistant Surgeons in the distribution of quinine in malarious areas and in anti-malarial measures has been extended; and this work is well appreciated. Central depôts for the sale of quinine at the head quarters of districts were also established. The number of women and female children who resort to dispensaries continues to increase rapidly.

The total expenditure on hospitals amounted to about £68,600, of which £15,722 was derived from subscriptions; only 5,572 in-patients paid for their own food, *i.e.*, less than 12 per cent.

Calcutta. There was a slight decrease in the number of in-patients, due chiefly to the closing of some of the wards of the Medical College Hospital for repair.

The whole question of nursing, especially at the larger hospitals, is under consideration. Receipts from paying patients have increased, and expenditure on extensions and repairs has decreased. The total expenditure was £93,857. Subscriptions and donations fell from £8,000 to £4,000.

The number of operations performed rose from 32,786 to 33,909. There was a marked increase in the number of female patients who attended these hospitals.

Three dispensaries were added, marking a total of 353. Slightly fewer in-patients were treated, but the number of out-patients shows an increase of 195,146. The system of treatment at fairs and markets has extended and is evidently popular. **Eastern Bengal and Assam.**

The total expenditure amounted to about £45,000, a slight increase over last year's figure. Subscriptions from Indians only brought in £4,500, or about £700 less than in 1908.

There was a considerable increase in the number of operations performed.

The number of dispensaries has risen from 365 to 376, and the total number of patients shows an increase of over 2½ millions. During the past four years the attendance at female dispensaries has shown a marked improvement. Large quantities of quinine were distributed free of cost and had a most satisfactory effect on the death rate from malaria. Anti-plague inoculations were energetically carried out. **United Provinces.**

A sum of £ 27,000 was spent on new works; the total expenditure on hospitals and dispensaries amounted to £94,000; subscriptions from Indians brought in £8,100.

The pay and prospects of Civil Hospital Assistants have been improved, and they are now called "Sub-Assistant Surgeons." It is hoped that the shortage in this class of subordinates will now disappear.

The year was a healthy one, and the total number of patients shows a decrease of 71,000. This was due to the large reduction in malaria cases. Eleven new dispensaries were opened, and the number of in-patients has increased. Female patients resort to these institutions more freely, and efforts are being made to recruit more female Assistant Surgeons and Hospital Assistants. **Punjab.**

The Inspector-General draws attention to the necessity for raising the professional status of Hospital Assistants.

The sale of medicines to well-to-do persons brought in £270 during the year. This is a system intended to reduce the wholesale abuse of charities, which was brought to notice by the Lieutenant-Governor in last year's report.

New hospitals have been completed at Rohtak and Jullundur and much has been done to improve existing institutions. The expenditure during the year amounted to £ 82,000, and of this sum only £2,000 was contributed by the Indian community in subscriptions.

Four dispensaries have been added, but there is urgent need for more; the number of patients continues to increase. The Lady Minto Swat Hospital near the Malakand has been opened, and is attracting many patients; another large female Hospital is being built at Dera Ismail Khan. Considerable improvements have been effected in some of the existing buildings. **North-West Frontier Province.**

Difficulty is still experienced in attracting good Assistant Surgeons, Hospital Assistants and compounders. The number of students belonging to the province who are undergoing medical instruction is very small, and the pay will have to be improved.

The expenditure for the year amounted to £12,500, of which sum only £200 was subscribed by Indians.

There was a slight increase of attendance, but the prevalence of plague is still said to be keeping patients away. There was a marked rise in the number of cases of diseases of the eye. Expenditure for the year amounted to about £ 29,500, of which some £ 3,200 was subscribed by Indians. **Central Provinces.**

The year was a healthy one, and there were fewer in-patients. The attendance of Musulman women shows a further increase of 8 per cent. A new out-patients block has been added to the Quetta Hospital. The total expenditure amounted to about £7,000, and less than £20 represented subscriptions by the Indian community. **Baluchistan**

Six dispensaries have been added, and the number of cases treated has increased by 36 per 1,000. Female patients resort more freely to the hospitals every year, and the employment of trained midwives for cases of labour in their own homes continues to be very popular. There is still need for more dispensaries of the class supported by Local Bodies. **Madras.**

The number of operations rose from 194,659 to 211,216.

Subscriptions amounted to £3,850, of which sum only £2,000 was subscribed by Indians. The expenditure amounted to £144,576. The special female hospitals are being more generously supported than formerly.

Bombay. There was a decrease in the number of in-patients, which is not explained. A scheme for increasing the number of dispensaries is under consideration. The experiment of sending subordinates out into malarial districts to treat cases in their own villages has been tried and will be repeated.

Improvements have been effected in many of the larger hospitals.

The total expenditure was £116,450, of which amount only a little over £1,000 was covered by subscriptions from Indians.

Burma. Thirteen new dispensaries have been opened and there has been a marked rise in the number of cases treated, and of operations performed. The new General Hospital at Rangoon has been opened and is attracting many patients.

The Civil Sub-Assistant Branch is still very much below strength, but it is hoped the new rates of pay will improve matters.

The total expenditure was £89,280, of which £3,400 was obtained by subscriptions and donations.

Arrangements have been made for an improvement in the nursing staff at Headquarters hospitals and for training of male nurses.

B.—Civil Hospitals and Dispensaries (State Special and Railway and Private non-aided).

There are 656 State Special and Railway and 680 Private non-aided hospitals.

The annexed table shows the principal items of information regarding them :—

Institutions.	In-patients.	Out-patients.	Total.	Operations performed.
1. State Special and Railway	99,841	2,011,882	2,111,723	42,084
2. Private non-aided	41,416	4,539,459	4,580,875	122,237
Total 1909 ...	141,257	6,551,341	6,692,598	164,321
„ 1908 ...	141,070	6,810,622	6,951,692	161,913

The decline in numbers of cases is slight; but, as the statistics supplied by non-aided institutions are not in the form laid down for Government dispensaries, it is not possible to compare the figures for succeeding years satisfactorily.

In spite of the comparative healthiness of the year the patients treated in State Special dispensaries show an increase.

C.—Lunatic Asylums.

The following table shows the strength of the Asylum population in 1909 and the statistics of sickness and mortality.

The figures show very little variation on those of last year.

The total expenditure amounted to about 11½ lakhs or £77,500; and of this amount Rs. 93,103 or £6,200 were derived from paying patients.

In Burma paying patients cover a quarter of the total expenditure, whereas in Eastern Bengal their fees only cover one-twentieth.

Administration.	Admitted and readmitted during 1909.	Total Asylum Population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Number of Criminal lunatics.
		Males.	Females.	Total.					
Bengal	197	860	202	1,062	69	47	886·54	115·72	4,444
Eastern Bengal and Assam	165	552	99	651	42	69	510·68	33·96	314
United Provinces	263	1,064	346	1,410	122	108	1147·85	132·94	227
Punjab	199	674	163	837	96	85	632·85	75·01	168
Burma	199	677	109	786	45	49	604·87	20·61	383
Central Provinces	95	307	89	396	34	33	309·66	4·58	95
Bombay	364	1,088	267	1,355	120	130	988·6	23·9	199
Madras	227	661	220	881	90	48	677·14	67·86	189
Total ... {1909	1,709	5,883	1,495	7,378	618	569	5758·19	474·58	2,019
{1908	1,715	5,774	1,473	7,247	653	556	5641·08	450·12	2,069

The accommodation is barely adequate for the average asylum population, and an extension will shortly be required. The general health shows an improvement on last year, and there were only 47 as compared with 65 deaths; the death rate fell from 7·63 to 5·3 per cent. This indicates a general improvement in sanitary conditions; but the Bengal asylums still show a much higher sick rate than those of any other province. **Bengal.**

There was slight overcrowding throughout the year at Dacca and great overcrowding at the Tezpur asylum. Proposals for an extension of accommodation are under consideration by Government. **Eastern Bengal and Assam.**

The general health was good.

There was slight overcrowding at Benares, where a new barrack of 30 cells is being built. An isolation ward for tuberculous cases will be constructed at Bareilly. In future all female criminal lunatics will be sent to Agra. The water-supply at Agra has been improved. The year was a satisfactory one from the point of view of health of the inmates. The money received from paying patients shows a marked decline, having fallen from Rs. 6,607 in 1907 to Rs. 4,907 in 1908 and Rs. 2,375 in 1909. **United Provinces.**

There was an increase in sickness and also in mortality, largely the result of bowel complaints. The etiology of these diseases in the asylum is under investigation. Meanwhile the new hospital has been completed and enables the segregation of tuberculous cases to be carried out and the overcrowding complained of, of recent years, has now been remedied. The difficulty of obtaining suitable warders continues; an attempt is now being made to get ex-soldiers to take employment. **Punjab.**

The manufactures of the asylum have produced a profit of nearly £500, a satisfactory increase on last year's figure.

There was again overcrowding in both asylums, and extensions to the Rangoon asylum are under consideration. The general health has been good, but three cases of cholera occurred in the Minbu asylum. In Rangoon the water-supply is insufficient, and this has interfered with gardening operations, hitherto a source of revenue. The money received from paying patients amounted to Rs. 25,000, a figure largely greater than that of any other province, except Bombay which has far more patients. **Burma.**

The year was a very healthy one. The new buildings at the Nagpur asylum are nearly ready; and the Jubbulpore institution, on transfer of its occupants to Nagpur, will be closed. **Central Provinces.**

The number of inmates in the seven asylums is steadily increasing; from 1,307 in 1907 it has now risen to 1,355, and additional accommodation is either being built or is contemplated in several of these institutions. The water-supply at Colaba and Ratnagiri is reported to be insufficient. The daily average of sick was very low, only 23·9; but the number of deaths was high, 130 as compared with 86 and 67 in the previous two years. This was the result of a severe outbreak of cholera at Thana and a minor one at Poona. There were 37 deaths from this cause. **Bombay.**

There is urgent need of a better class of asylum attendant; the question of a revision of their pay is under consideration.

The asylum population is increasing, and extension of accommodation will have to be considered ere long. The increase in the past decade amounts to 25 per cent. The year was a healthy one, and the number of deaths was only 48. There was a satisfactory increase in receipts from paying patients and the products of the asylum factories. **Madras.**

D.—Medical Colleges and Schools.

Medical College, Calcutta.—The number of applicants for admission and of students selected continues to rise. The provision of a hostel for civil students is an urgent necessity, but funds are not available. 56 students passed the final L. M. S. or M. B. examinations, and 5 military students received a diploma and entered the service; and 28 pupil nurses and 16 "dhais" obtained certificates. There were 465 male pupils excluding 85 military pupils, and 16 female. **Bengal.**

The total expenditure was £18,582 and fees received from students amounted to £3,516. The average cost of education of a military student (including maintenance) is £84 and that of other students £23.

Medical Schools.—There was an increase in the number of students admitted to the Temple and Cuttack schools, but a decrease at the Campbell. At the latter a great many improvements have been effected in the buildings. 60 male students passed the final examination and 16 entered Government service.

The three schools together cost £8,411, and £877 were received as fees; and 495 male and 26 female students were under instruction during the year. Additions were made to the teaching staff of all.

United Provinces. *Agra Medical School.*—There were 258 male and 71 female students. Of these 64 males and 18 females appeared for the final examination and 46 and 13, respectively, passed.

Admission to the civil class is now only open to residents of the United Provinces who hold entrance certificates of the Allahabad University.

The school pathological laboratory is doing good work.

Eastern Bengal and Assam. The number of students in the Berry White school at Dibrugarh and the Dacca school was 319.

The Dacca school is in urgent need of boarding houses for students and of proper surgical appliances, and the Mitford hospital, in which clinical instruction is given, also requires thorough renovation of buildings and equipment. There are only 6 female students.

A few minor improvements were carried out at the Dibrugarh school. More boarding houses are needed. There is now an X-ray installation. A class has been started for compounders.

Burma. The Rangoon school has made some progress and there are 28 students, of whom 23 receive stipends from the Government. The accommodation is quite inadequate, and the instruction is handicapped accordingly. The students are said to be markedly below the average, as compared with other schools.

Punjab. *Lahore Medical College and School.*—The average number of students on the rolls were 180 and 207 respectively, as compared with 204 and 193 in the previous year. The reduction, in the case of the college is chiefly due to the elimination of the preliminary Science classes.

54 students went up for the final L. M. S. or M. B. examination and 25 passed—at the final qualifying examination of the school 33 passed out of 35 who competed.

Central India. *Indore Medical School.*—The chiefs have handed over the old Daly College for the accommodation of the school, and 40 new quarters are being built for students. There are now 72 students.

Madras. *Medical College.*—The strength of the college is increasing steadily, except in the Chemist and Druggist Department which has proved a failure. 16 students passed the M. B. and 13 passed the L. M. S. The refresher courses for sub-assistant surgeons are working satisfactorily, as also are the special classes for sanitary inspectors. The students number 367.

Tanjore.—Prince of Wales School.—The decision to abolish this school is postponed. There has been an increase in the number of students from 48 to 57. At the final examination 5 out of 8 students passed.

Royapuram.—A new hospital is to be constructed, which will afford better facilities for clinical instruction than exist at present. The number of students has fallen from 161 to 144, as military sub-assistant surgeons are no longer being trained here. 26 students passed the final examination out of 28 who competed.

Vizagapatam.—The strength of the school has fallen from 50 to 42, all military pupils being now sent to Royapuram. A new building has been provided for the school, and the present building will become a hostel. 4 students passed the final examination.

Bombay. *Grant Medical College.*—A new hostel, lecture theatre and pathological laboratory have been opened. A physiological laboratory is under construction. The question of building a hostel for military pupils is under consideration.

There were 518 students at the end of the year. 89 passed the final L. M. S. out of 211 who went up. There are 25 women students.

B. J. School, Poona.—There were 127 pupils, of whom 65 are military. New school buildings and a hostel have been taken into use. The question of increasing the staff is under consideration.

B. J. School, Ahmedabad.—There were 135 pupils of whom 67 were military. A hostel has been opened for 46 students. More tutors are required in the anatomy department, in which the practical training is very defective. A maternity ward is much required.

Hyderabad.—There were 51 pupils; but the teaching staff consists of only the Superintendent and 2 assistants.

E.—INSTITUTES.

The X-ray Institute of India, Dehra Dun.

Two classes of instruction have been held during the year, numbering 39 students in all. Of this number 34 passed the prescribed examination, 8 obtaining special 'proficiency' certificates, and 5 failed to pass. The students included Medical Officers of both services (Civil and Military), Assistant Surgeons and Hospital Assistants as well as one Hospital Assistant from a Native State.

The number of skiagraphic examinations made at the Institute was 1,110, the electrolytic interrupter and direct running from the mains being ordinarily employed.

The Divisional (Military) apparatus has now been in use for some eighteen months, and gives little trouble except in the matter of accumulator batteries. The so-called portable batteries sent from home have been found far too fragile for employment in this country, but an improved pattern has been devised at the Institute, which has successfully withstood very severe tests in transportation, and which it is hoped will go far towards remedying this formerly defective item in the service equipment. Certain minor additions to the sets have been made with the object of protecting patient and operator as far as possible from the risk of X-ray traumatism. A small portable oil engine for use at Base Hospitals is also being tested. The number of cases of disease sent for treatment during the year was 51. This number would have been largely augmented if hospital accommodation had been available, and the building of a small hospital in connection with the Institute together with a few sets of quarters for paying patients would be a very valuable addition.

A scheme for enlarging the workshop accommodation, and increasing the subordinate staff in order to enable the Institute to undertake repairs for all Civil Institutions in this country is under the consideration of Government.

No case of X-ray traumatism has occurred amongst either the patients, staff or students of the Institute.

Research Institutes.

Accounts of the Central Research Institute at Kasauli, the Bombay Bactereological Laboratory, the King Institute, Madras, and the Pasteur Institutes at Kasauli and Coonoor will be found at pages 122 to 125 of this report.

VII—SANITATION.

Bengal. Excluding Calcutta, there were 128 municipalities in Bengal, and they spent in the aggregate 39·67 per cent of their income on original and recurring sanitary works, compared with 39·51 in 1908. The actual sums expended under the three main heads of sanitation, namely, conservancy, water-supply and drainage, were more than in 1908 by about £16,500. The increased expenditure of over £6,000 on drainage was mainly due to the construction of drains and the preparation of schemes in the Presidency, Burdwan and Bhagulpur Divisions.

The Sanitary Board held three meetings during the year. Among the principal subjects of discussion were the Howrah drainage scheme and the Darjeeling water-supply and sewerage scheme. Numerous water-supply and drainage schemes occupied the attention of the Board, and it was expected that work on a good many of them would be commenced during 1910.

Calcutta City. The alignment of areas where huts are likely to spring up has been completed, and the hut alignment lines have all been demarcated on the ground. The area covered by the latter operations was nearly five miles. Progress in the construction of the overhead reservoir at Tallah has been most satisfactory, and the reinforced concrete foundations were completed in October 1909 at a cost of £27,590. The erection of the large steel structure forming the reservoir itself, which is estimated to cost £91,367, was then commenced and was in its last stages at the end of the year under report. Contracts were also given for laying a large steel main from Tallah to Wellington Square through which the water from the tank will be distributed and some progress was made. The construction of the Tolly's Nullah syphon was completed during the year and the approach sewers connected. The Garden Reach drainage scheme was also completed.

Eastern Bengal and Assam. Municipalities in Eastern Bengal and Assam spent 50·48 of their total income upon sanitation during 1909, compared with 47·94 per cent in 1908. This represents an increased expenditure of nearly £13,500, due mainly to the extension of the Dacca water-supply. The Dacca conservancy tramway referred to in the last report was completed and handed over to the municipality in December 1909, and the surface drainage of the new civil station was in progress. The Sanitary Board afforded much useful advice to Government on the numerous schemes of sanitary improvement submitted to it.

United Provinces. Progress in sanitation in the United Provinces continues, and the Sanitary Board, which met nine times during the year, criticized and approved of projects for improving the sanitary conditions of municipalities at an aggregate estimated cost of over £100,000. The total expenditure incurred on sanitary works under the supervision of the Sanitary Engineer in 1909-10 was £46,200. In March 1909, Dr. Gilbert Fowler of Manchester visited the provinces and furnished a valuable report on the treatment of sullage.

Punjab. Out of an income of £399,321, municipal towns in the Punjab spent £195,400, or 49 per cent upon public health and convenience, compared with 48·34 per cent in 1907-08. Of this sum, about £28,300 were spent on water-supplies, £16,700 on drainage, and £52,650 on conservancy, road clearing and watering and latrines. The Simla hydro-electric scheme referred to in last year's report was in progress, and the intramural drainage of several sections of the city of Amritsar was under construction. A valuable improvement was effected in the water-supply at Delhi by the connection of the wells with the suction at the intake whereby clear water can be drawn from the wells when the river is in flood; and the suburban drainage scheme of this town, estimated to cost £28,700 was progressing well.

The Sanitary Board was strengthened during the year and met eight times. Various schemes of sanitary improvement were considered and estimates were sanctioned aggregating £12,270 for various water and drainage schemes, towards which the local Government have given a grant-in-aid of £10,000.

North-West Frontier Province. Although no new sanitary work of any magnitude was carried out in this province during the year, a great deal of improvement was effected in the sanitation of Peshawar and Dera Ismail Khan.

Central Provinces and Berar. The Municipalities in the Central Provinces spent 46 per cent of their income on original and recurring sanitary works, such as water-supply, conservancy, markets and

slaughter houses. Improvements in the water works at Nagpur were in progress and the extension of the water-supply scheme at Harda at an estimated cost of £80,000 was proceeding.

The Sanitary Board met at 11 headquarter towns, and the work done under their direction was mainly the improvement of village sites and water-supplies. On February 1st, 1910, a separate appointment of Sanitary Commissioner was created.

Madras Presidency.

The total income of the district municipalities during 1909-10 was £354,070, of which £40,880 were spent on water-supplies, £5,747 on drainage and £63,515 on conservancy, including the up-keep of roads, etc. The figures under the first two heads represent a substantial increase of £14,725 and £1,700 respectively over the expenditure during the previous year. District Boards made an allotment of £69,074 for sanitary purposes, and a special grant of £33,140 from provincial funds was distributed among municipalities and district boards for expenditure on sanitary works such as the opening of congested areas, town extensions, improvements of water-supplies, etc. The construction of the water works of Berhampore, Bezwada, Salem and Periyakulam, the extension of the water works at Gudiyattam, and improvements in the water-supply works at Trichinopoly and Madura were among the sanitary works which were being carried out by the Public Works Department during 1909-10.

The Sanitary Board examined 143 sanitary schemes during the year. The most important of these were the water-supplies of Vizianagram, Ellore, Chingleput and Palamcottah and the drainage of Srirangam and Trichinopoly.

Madras City.

Designs and plans for new works for the main drainage of the city, estimated to cost £107,307, were completed, and the Corporation have entered into a contract for the supply of pumps and other machinery required for the drainage of Georgetown at a cost of £17,830. The local Government sanctioned the proposals for the Tondiarpet drainage scheme, which is estimated to cost £71,400, and work has been commenced. These are the principal schemes upon which the attention of the Corporation has been engaged during the year, but the outstanding feature of the year's work has been the commencement of construction on the new water works referred to in the report for 1907. These are estimated to cost £106,076, contracts have been entered into, and arrangements made therein for completion of the whole scheme by the 31st March 1910.

Bombay Presidency.

The income of the 157 municipalities in the Presidency excluding Bombay City was £543,440 and £126,716 were spent on the improvements of water-supplies, drainage and conservancy. Sanitary works of importance are in process of construction or are under investigation in 33 towns. The Pundharpur water-supply project referred to in last year's report was completed, but progress on the town's drainage scheme was delayed by changes in the staff. Estimates amounting to £23,633 and £19,733 respectively for water-supply schemes at Nasik and Hyderabad were sanctioned, and work was begun on both. The distribution of the water-supply at Karachi was extended and the drainage works of that city continued.

The Sanitary Board met five times during the year, and among other matters considered various proposals for improvement of the water-supplies of eight large towns and of the drainage of the Vaccine Depôt at Belgaum and the Police lines at Bhamburda.

Bombay City.

The works in connection with the Malabar Hill sectional sewerage scheme and the extension of the Low Level Channel No. II from DeLisle Road to Dadar Road were completed during the year. A satisfactory feature of the year's operations in the Water Works Department is the completion of two important works in connection with the Malabar Hill Reservoir, namely, a new inlet main from Chinchpokli to the Reservoir and a new outlet main from the Reservoir to Chowpati. The long deferred work of improving the conditions of storage at the Malabar Hill Reservoir was taken in hand and practically completed. The water proofing works at the Bhandarwada Reservoir were still in hand, but some progress was made during the year.

Burma.

Excluding Shwebo the total income of the districts and of municipal towns was £1,038,153 and the total expenditure £315,679, of which £107,994 were spent on water-supplies, £87,459 on conservancy, £41,047 on drainage and £79,179 on other sanitary works. The amount of new work of importance carried out during the year appears to have been limited, but several surveys and projects were drawn up and a few schemes were examined and reports upon them prepared.

The Sanitary Board met twice during the year and considered the amended scheme for the water-supply of Bassein, the water-supply scheme for Minbu, the amended estimates for the Kyaiklat water-supply and conservancy schemes, the amended estimates of the Minbu water-supply scheme, the amended estimate of the Thayetmyo water-supply scheme, and proposals for laying out of railway towns.

ABSTRACT OF THE REPORT OF THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1909.

Meteorology of the year.

Summary of the meteorological phenomena of the year.

The following memorandum on the rainfall and other weather conditions of India in 1909 has been furnished by the Meteorological Department of the Government of India.

CHIEF FEATURES OF THE RAINFALL OF 1909.

I.—The cold weather season was unusually free from storms and the precipitation more or less below normal over nearly the whole of northern and central India. The rainfall of the period was on the other hand in moderate to large excess in the Bay Islands, Lower Burma, Mysore and Madras.

II.—The hot weather period March to May was on the whole very wet over a large part of the country, the only divisions which received decidedly less than the normal quantity of precipitation being Assam, the North-West Frontier Province, Kashmir, Sind, the Konkan and the Bombay Deccan.

III.—The monsoon currents were on the whole more vigorous than usual, and practically the whole of the country with the exception of the Central Provinces, Central India east and Hyderabad north received satisfactory rain. The rains were unusually abundant in Kashmir, the Punjab, the North-West Frontier Province, Rajputana west, Madras southeast and the Madras Deccan.

IV.—The retreating monsoon current was determined chiefly to Burma and Eastern Bengal, with the result that while these areas obtained considerably more than their normal allowance of rainfall the greater part of the peninsula suffered from a deficiency. In north-western and central India the winter conditions set in in December, somewhat earlier than usual.

V.—On the whole the rainfall of the year 1909 was more abundant than usual, the total precipitation on the plains of India being above normal by 2·1″ or 5 per cent. The excess was fairly general and was almost as large in amount in the dry zone of the Punjab and Rajputana as in Burma and Bengal. The deficiency was restricted almost entirely to Assam, Baluchistan and the central part of the country; and in no sub-division did it exceed 16 per cent in amount.

Total Rainfall of the year 1909.

Sub-division.	Rainfall, whole year.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	113·1	96·3	+16·8	+17
2. Lower Burma	132·7	123·0	+9·7	+8
3. Upper Burma	47·2	41·6	+5·6	+13
4. Assam	89·2	100·2	−11·0	−11
5. Eastern Bengal	96·7	85·4	+11·3	+13
6. Bengal	67·2	58·1	+9·1	+16
7. Orissa	59·7	57·6	+2·1	+4
8. Chota Nagpur	55·1	53·4	+1·7	+3
9. Bihar	53·3	49·4	+3·9	+8
10. United Provinces, East	42·1	40·0	+2·1	+5
11. Do. do. West	42·0	39·0	+3·0	+8
12. Punjab, East and North... ...	31·8	23·8	+8·0	+34
13. Punjab, Southwest	11·4	8·9	+2·5	+28
14. Kashmir	29·6	27·6	+2·0	+7
15. North-West Frontier Province ...	18·7	16·3	+2·4	+15
16. Baluchistan	7·1	8·3	−1·2	−14
17. Sind	6·3	6·6	−0·3	−5
18. Rajputana, West	18·3	11·8	+6·5	+55
19. Do. East	29·1	24·5	+4·6	+19
20. Gujarat	34·8	35·1	−0·3	−1
21. Central India, West	34·1	34·4	−0·3	−1
22. Do. East	39·7	45·6	−5·9	−13
23. Berar	31·3	31·3	0	0
24. Central Provinces, West ...	39·9	45·6	−5·7	−13
25. Do. East ...	50·5	52·9	−2·4	−5
26. Konkan	111·4	113·2	−1·8	−2
27. Bombay Deccan	28·6	32·2	−3·6	−11
28. Hyderabad, North	30·0	35·8	−5·8	−16
29. Do. South	27·9	29·7	−1·8	−6
30. Mysore	41·1	36·2	+4·9	+14

TOTAL RAINFALL OF THE YEAR 1909—*contd.*

Sub-division.	RAINFALL, WHOLE YEAR.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
31. Malabar	138·1	128·7	+9·4	+7
32. Madras, Southeast	36·1	35·7	+0·4	+1
33. Do. Deccan	26·9	24·8	+2·1	+8
34. Do. Coast, North	38·4	40·3	—1·9	—5

THE COLD WEATHER PERIOD, JANUARY AND FEBRUARY.

General Summary.—The number of well formed storms of the cold weather type which passed over northwest India was less than usual, and accordingly the precipitation was comparatively small in amount over practically the whole of northern and central India, the region where the winter rainfall usually occurs. Weather was on the other hand exceedingly disturbed in the beginning of January over the southern half of the Peninsula owing to the passage of a storm from the Bay, and in February in the Bay Islands and Lower Burma.

The aggregate rainfall measurements of the season were equal to or in excess of the normal in Madras, Mysore, Hyderabad north, the Central Provinces west, Gujarat, Kashmir, Chota Nagpur, Lower Burma and the Bay Islands ; but in rest of the country the fall was more or less below the average. The deficiency averaged an inch in amount over Assam and Eastern Bengal, three-quarters of an inch in Bengal, Bihar and the United Provinces, and half an inch in the Punjab, Baluchistan and Rajputana east.

Over a large part of the country humidity was rather low and temperature approximately normal. On the other hand in spite of the defect of precipitation the cloud proportion was high in most of the divisions.

Burma.—The total rainfall of the period was irregularly distributed, being 67 per cent] in excess in Lower Burma and equally in defect in Upper Burma. The amount of cloud was equal to or above the normal except in the region represented by Mergui, Tavoy, Bassein, Bhamo and Lashio. Humidity was inclined to be high. Temperature agreed closely with the average.

Northeast India, including Orissa.—The rainfall fell short of the normal everywhere except locally in Chota Nagpur. The defect ranged from 10 per cent in Orissa to over 60 per cent in Bengal, Bihar and Eastern Bengal. The deviations from normal of temperature and humidity were such as usually accompany a defect of rainfall ; they were however not very marked. Skies were covered to the customary extent in Eastern Bengal and Assam, but over the rest of the division the proportion of cloud was somewhat above the normal.

The United Provinces, Central India and the Central Provinces.—Rainfall was normal or nearly so in the Central Provinces west, Berar and Central

India east, and well below the average in the rest of the division. There was about the usual amount of cloud in the United Provinces and the Central Provinces, but in Central India the proportion of cloud was unusually high in spite of the defect of rainfall. The air was drier than usual in most places, particularly in the United Provinces where the percentage of saturation was 8 in defect. The temperature conditions did not depart appreciably from the normal.

Northwest India.—Except in Kashmir and Gujarat the precipitation of the period was less than usual everywhere. The proportional deficiency was most marked in Sind and Rajputana which obtained only 60 per cent of their normal supply. Humidity was low in the North-West Frontier Province, rather high in Kashmir and Baluchistan, and about the average elsewhere. Skies were more clouded than usual in Kashmir and Baluchistan, unusually free from cloud in the North-West Frontier Province, and covered to about the customary extent elsewhere. Temperature did not differ to any great extent from the normal in the plains, but in Kashmir and Baluchistan weather was $2\frac{1}{2}^{\circ}$ to $4\frac{1}{2}^{\circ}$ cooler than usual.

The Peninsula.—Rainfall was much heavier than usual in almost all places, the only exceptions being the Konkan, the Bombay Deccan and Hyderabad south. The excess was unusually large in Mysore, Malabar, Madras, southeast and the Madras Deccan, ranging between three quarters of an inch and four inches. The humidity agreed closely with the normal. The quantity of cloud was in decided excess in the region of heavy rainfall as well as in Hyderabad. Temperature was within 2° of the normal.*

Division.	Cold Weather Period, January and February.						
	Rainfall.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity.	Cloud.
	"	"	"		°		
Burma	0·3	0·3	0	0	+ 0·5	+ 3	+ 0·5
Eastern Bengal and Assam.	0·8	1·8	—1·0	—56	+ 0·5	+ 5	— 0·1
Bengal	0·7	1·2	—0·5	—42	+ 1·1	— 3	+ 0·5
United Provinces ...	0·8	1·5	—0·7	—47	+ 0·1	— 8	+ 0·1
Punjab	1·6	2·1	—0·5	—24	— 1·5	— 3	— 0·3

* Further details will be found in the two following tables, whereas in all the other tables contained in this memorandum, stations at an altitude above sea level greater than 3,200 feet are neglected; exception is made in the divisions of Kashmir and Baluchistan where stations of all altitudes are included.

Division.	Cold Weather Period, January and February.						
	Rainfall.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity.	Cloud.
	"	"	"		°		
North-West Frontier Province.	2·4	2·7	—0·3	—11	— 2·3	— 7	— 0·5
Sind	0·3	0·5	—0·2	—40	— 1·2	— 2	+ 0·2
Rajputana ...	0·3	0·5	—0·2	—40	— 1·5	— 3	— 0·3
Bombay ...	0·1	0·2	—0·1	—50	— 0·1	0	+ 0·3
Central India ...	0·6	0·9	—0·3	—33	+ 0·3	— 5	+ 1·4
Central Provinces ...	0·7	0·7	0	0	+ 1·1	— 3	+ 0·3
Hyderabad ...	0·1	0·3	—0·2	—67	+ 1·5	— 1	+ 0·9
Mysore	0·9	0·1	+0·8	+800	+ 1·3	+ 1	+ 1·1
Madras	3·1	0·9	+2·2	+244	+ 0·3	+ 1	+ 1·0
Mean of India when the size of the above areas is taken into account.	0·9	0·9	0	0	+ 0·1	— 2	+ 0·4

Sub-division.	Rainfall, January and February.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	2·2	1·1	+1·1	+100
2. Lower Burma	0·5	0·3	+0·2	+67
3. Upper Burma	0·1	0·3	—0·2	—67

Sub-division.	Rainfall, January and February,			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
4. Assam	1·2	2·2	— 1·0	— 45
5. Eastern Bengal	0·3	1·3	— 1·0	— 77
6. Bengal	0·5	1·3	— 0·8	— 62
7. Orissa	0·9	1·0	— 0·1	— 10
8. Chota Nagpur	1·6	1·3	+ 0·3	+ 23
9. Bihar	0·5	1·3	— 0·8	— 62
10. United Provinces, East	0·6	1·2	— 0·6	— 50
11. Do. do. West ...	1·1	1·9	— 0·8	— 42
12. Punjab, East and North ...	1·8	2·4	— 0·6	— 25
13. Punjab, Southwest	0·7	1·1	— 0·4	— 36
14. Kashmir	6·8	6·4	+ 0·4	+ 6
15. North-West Frontier Province ...	2·4	2·7	— 0·3	— 11
16. Baluchistan	2·4	2·9	— 0·5	— 17
17. Sind	0·3	0·5	— 0·2	— 40
18. Rajputana, West	0·2	0·3	— 0·1	— 33
19. Do. East	0·3	0·7	— 0·4	— 57
20. Gujarat	0·1	0·1	0	0
21. Central India, West	0·2	0·5	— 0·3	— 60
22. Do. East	1·3	1·5	— 0·2	— 13
23. Berar	0·4	0·5	— 0·1	— 20
24. Central Provinces, West ...	0·9	0·9	0	0
25. Do. do. East ...	0·6	0·9	— 0·3	— 33
26. Konkan	0	0·2	— 0·2	—100
27. Bombay Deccan	0·1	0·2	— 0·1	— 50
28. Hyderabad, North	0·3	0·2	+ 0·1	+ 50
29. Do. South	0	0·3	— 0·3	—100
30. Mysore	0·9	0·1	+ 0·8	+800
31. Malabar	1·8	0·4	+ 1·4	+350
32. Madras, Southeast	4·9	1·2	+ 3·7	+308
33. Do. Deccan	1·6	0·2	+ 1·4	+700
34. Do. Coast, North	1·3	0·7	+ 0·6	+ 86

THE HOT WEATHER PERIOD, MARCH TO MAY.

General Summary.—As regards rainfall this period bore some resemblance to the corresponding season of 1907, but was conspicuously different from that of 1908. March was exceptionally dry, with a deficiency of 83 per cent in the rainfall, and April was remarkably wet with an excess of 110 per cent while the final month of the period was on the whole one of average precipitation. The total fall of the three months was 18 per cent above the normal; the excess was, however, not general, inasmuch as Kashmir, the North-West Frontier Province, Sind, Baluchistan, Eastern Bengal and Assam, the Konkan and the Bombay Deccan received less than their ordinary share. In the United Provinces, Rajputana, Central India, the Central Provinces and Malabar the fall was double to triple the normal amount, and in the rest of Madras and in Mysore the usual quantity was also greatly exceeded.

Over by far the greater part of the country the departures from normal of temperature and cloud were conditioned by those of rainfall, but were in general small in amount. Humidity was inclined to be rather low in Eastern Bengal and Assam, and the North-West Frontier Province, and slightly high in Rajputana and Central India.

Burma.—Rainfall was 1 per cent below normal in Lower Burma and 27 per cent above it in Upper Burma. On the average of the whole period temperature, humidity and cloud differed little from the average.

Northeast India, including Orissa.—Except in Assam and Eastern Bengal where it was 26 and 8 per cent in defect, the rainfall of the period was above normal in all parts of the division; the excess ranged from 15 per cent in Chota Nagpur to 37 per cent in Orissa. The amount of cloud was in considerable defect in Eastern Bengal and Assam, and normal elsewhere. Humidity was somewhat below the average. The departures from normal of temperature were small in amount.

The United Provinces, Central India and the Central Provinces.—Rainfall was abundant throughout the division, the excess ranging from 40 per cent in Berar to 170 per cent in the Central Provinces west and 260 per cent in Central India. The humidity was rather high, and the quantity of cloud in decided excess in Central India; but elsewhere the departures from normal of these elements were not marked. Temperature ruled below the average; the defect was, however, less than 1½° in amount.

Northwest India.—Rainfall was normal in amount in Gujarat, in defect in Kashmir, Baluchistan, the North-West Frontier Province and Sind, and above the average in the Punjab and Rajputana. The defect was as much as 75 per cent in Sind, while the excess averaged 35 per cent in the Punjab and 217 per cent in Rajputana. The amount of moisture was somewhat greater than usual in Rajputana, and in defect elsewhere. Skies were less clouded than usual in the Punjab, the North-West Frontier Province and Rajputana, and were covered to about the average extent elsewhere. Temperature was lower than usual by about 2° in the Punjab and Rajputana, and by 3° in Baluchistan; elsewhere the temperature conditions were very nearly normal.

The Peninsula.—Rainfall of the period was well above the normal in Mysore and Madras; in defect by 35 per cent in the Konkan and 17 per cent in

the Bombay Deccan, and normal over Hyderabad. On the average of the whole period temperature, humidity and cloud did not differ to any important extent from the normal.

Division.	Hot Weather Period, March to May.						
	Rainfall.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity.	Cloud.
	"	"	"		°		
Burma	11·7	10·7	+ 1·0	+ 9	— 0·2	0	+ 0·1
Eastern Bengal and Assam.	17·1	21·4	— 4·3	— 20	+ 0·1	— 5	— 0·9
Bengal	6·5	5·3	+ 1·2	+ 23	— 0·6	— 3	— 0·1
United Provinces ...	2·8	1·2	+ 1·6	+ 133	— 1·4	0	+ 0·1
Punjab	2·3	1·7	+ 0·6	+ 35	— 1·7	— 2	— 0·5
North-West Frontier Province.	2·0	3·8	— 1·8	— 47	— 1·0	— 5	— 0·7
Sind	0·1	0·4	— 0·3	— 75	— 1·4	— 3	— 0·1
Rajputana ...	1·9	0·6	+ 1·3	+ 217	— 2·1	+ 4	— 0·4
Bombay... ...	1·3	1·6	— 0·3	— 19	— 0·4	— 2	— 0·4
Central India ...	1·8	0·5	+ 1·3	+ 260	— 1·0	+ 4	+ 1·1
Central Provinces ...	2·5	1·2	+ 1·3	+ 108	— 1·0	+ 1	+ 0·4
Hyderabad ...	1·9	1·9	0	0	— 0·3	— 4	+ 0·1
Mysore	8·3	5·3	+ 3·0	+ 57	— 0·4	— 2	— 0·2
Madras	7·7	4·5	+ 3·2	+ 71	— 0·6	0	+ 0·1
Mean of India when the size of the above areas is taken into account.	5·3	4·5	+ 0·8	+ 18	— 0·9	— 1	— 0·1

Sub-division.	Rainfall, March to May.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	18·6	15·5	+ 3·1	+ 20
2. Lower Burma	14·7	14·8	— 0·1	— 1
3. Upper Burma	9·3	7·3	+ 2·0	+ 27
4. Assam	20·1	27·3	— 7·2	— 26

Sub-division.	Rainfall, March to May.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"		"	
5. Eastern Bengal	14·6	15·3	— 1·3	— 8
6. Bengal	9·2	7·6	+ 1·6	+ 21
7. Orissa	7·8	5·7	+ 2·1	+ 37
8. Chota Nagpur	4·5	3·9	+ 0·6	+ 15
9. Bihar	3·6	3·1	+ 0·5	+ 16
10. United Provinces, East	2·8	1·1	+ 1·7	+ 155
11. Do. do. West	2·9	1·3	+ 1·6	+ 123
12. Punjab, East and North	2·5	1·8	+ 0·7	+ 39
13. Do Southwest	1·5	1·3	+ 0·2	+ 15
14. Kashmir	3·6	6·9	— 3·3	— 48
15. North-West Frontier Province ...	2·0	3·8	— 1·8	— 47
16. Baluchistan	1·6	1·8	— 0·2	— 11
17. Sind	0·1	0·4	— 0·3	— 75
18. Rajputana, West	1·1	0·4	+ 0·7	+ 175
19. Do. East	2·3	0·7	+ 1·6	+ 229
20. Gujarat	0·3	0·3	0	0
21. Central India, West	1·3	0·4	+ 0·9	+ 225
22. Do. East	2·7	0·8	+ 1·9	+ 237
23. Berar	1·4	1·0	+ 0·4	+ 40
24. Central Provinces, West	2·7	1·0	+ 1·7	+ 170
25. Do. do. East	4·3	1·8	+ 2·5	+ 139
26. Konkan	1·3	2·0	— 0·7	— 35
27. Bombay Deccan	1·9	2·3	— 0·4	— 17
28. Hyderabad, North	1·6	1·5	+ 0·1	+ 7
29. Do. South	2·1	2·1	0	0
30. Mysore	8·3	5·3	+ 3·0	+ 57
31. Malabar	22·5	10·5	+ 12·0	+ 114
32. Madras, Southeast	7·1	4·6	+ 2·5	+ 54
33. Do. Deccan	4·0	2·5	+ 1·5	+ 60
34. Do. Coast, North	6·0	3·4	+ 2·6	+ 76

The Southwest Monsoon Period, June to September.

General Summary.—The monsoon rains of 1909 were on the whole plentiful and well timed : the distribution of rainfall also was favourable except in a small area defined by the Central Provinces and adjacent districts to the north, where the rains commenced considerably later and ended earlier than usual.

The first burst of monsoon rainfall occurred on the 6th of June in northeast India and two days later in the United Provinces. The monsoon appeared on about the usual date on the Malabar coast but did not extend fully inland until nearly the end of June. During July strong and steady currents prevailed and gave abundant rain over a large part of the country, but particularly in northwest India.

A large weakening of the Arabian Sea current occurred on August 7, in consequence of which dry weather set in over northwest India. The break thus initiated extended eastwards and southwards, and by the 10th had embraced the whole of the country except the eastern margin of the field of the Bay current. The monsoon currents revived considerably after the 19th, and by the 25th rainfall had again become general. This period of abundant rainfall lasted until the 11th September in upper India, from which the monsoon then retreated finally ; the normal date for the event is the 15th September.

The total precipitation of the period reached or exceeded the average over a large part of the country, the only districts which failed to receive their normal quantity being Assam, Central India, the Central Provinces, the Bombay Deccan, Hyderabad north and Baluchistan. The defect was not, however, important except in Central India east and the Central Provinces proper, where feebleness of monsoon conditions was persistent and the deficiency averaged about 6″ or 15 per cent. On the other hand the region of greatest proportional excess was defined by Rajputana west (+ 52 per cent.), the North-West Frontier Province (+ 43 per cent.), the Punjab and the Madras Deccan (each + 37 per cent.) and Kashmir (+ 35 per cent.).

The rainfall of the country as a whole was more than the average by 2″ or 6 per cent., the same amount as in the corresponding period of 1908. This is the largest excess on record since 1894.

As is usually the case during periods of abundant and well distributed precipitation, the air was damper, skies more clouded and temperature lower than the normal over a large part of the country ; the amount of departure was, however, in almost all cases small.

Burma.—The total precipitation of the period agreed closely with the normal value, being in excess by 4 per cent. in Lower Burma and 1 per cent. in Upper Burma. Temperature, humidity and cloud did not depart appreciably from the mean.

Northeast India, including Orissa.—There was more rain than usual during the season throughout the division with the exception of Assam. The excess was, however, small, nowhere reaching 20 per cent. in amount. The quantity of cloud was appreciably low in Eastern Bengal and Assam, but the departures from normal of humidity and temperature were of little significance.

The United Provinces, Central India and the Central Provinces.—Except in the United Provinces, where an excess of 6 per cent. occurred, the seasonal rainfall was more or less below the normal. The defect was most pronounced in the Central Provinces west where it amounted to 7·4″ or 18 per cent. The cloud proportion was decidedly high in Central India notwithstanding the defect of rainfall, and about normal in the other two areas. Humidity and temperature were in close agreement with the mean values.

Northwest India.—The whole of the division with the exception of Baluchistan received more than the normal quantity of rain. The excess was small in amount in Sind and Gujarat, but increased rapidly northwards and was as much as 3·7″ or 19 per cent. in Rajputana, and nearly 6″ or 37 per cent. in the Punjab. It was well marked also in the North-West Frontier Province and Kashmir where it amounted to 3·7″ (or 43 per cent.) and 4″ (or 35 per cent.) respectively. The monsoon rains were thus very favourable over practically the whole of the division.

Both humidity and cloud were slightly above the average in the region of excessive rainfall : in Baluchistan on the other hand the former was in marked defect and the latter normal. Temperature was nearly 2½° lower than usual in Rajputana and approximately normal elsewhere.

The Peninsula.—Rainfall was in trifling defect in the Bombay Deccan and Malabar, and 3″ or 10 per cent. below the normal value in Hyderabad north ; but in other parts of the division the usual amounts were more or less exceeded. The excess was absolutely greatest in the Madras Deccan which obtained 5½″ or 37 per cent. more than its average quantity ; it was considerable also in Madras Southeast 3·4″ (or 29 per cent). The deviations from normal of cloud, humidity and temperature were not marked.

Division.	South-West Monsoon Period, June to September.						
	Rainfall.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity.	Cloud.
	″	″	″		°		
Burma	62·1	60·2	+1·9	+ 3	—0·1	+ 1	+0·4
Eastern Bengal and Assam.	67·1	63·7	+3·4	+ 5	+0·3	— 1	—1·3
Bengal	49·7	43·7	+6·0	+ 14	—0·8	+ 1	+0·2
United Provinces ...	37·1	35·0	+2·1	+ 6	—1·5	+ 3	—0·5
Punjab	22·0	16·0	+5·9	+ 37	—1·5	+5	+0·3
North-West Frontier Province.	12·3	8·6	+3·7	+ 43	—1·2	+ 2	+0·7
Sind	5·7	5·5	+0·2	+ 4	0	+ 2	+0·4

Division.	South-West Monsoon Period, June to September.						
	Rainfall.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity.	Cloud.
	"	"	"		°		
Rajputana ...	22·9	19·2	+3·7	+19	—2·4	+ 5	+0·6
Bombay	42·9	42·4	+0·5	+ 1	—0·7	+ 1	+0·2
Central India ...	33·4	35·3	—1·9	— 5	—0·9	+ 4	+1·3
Central Provinces ...	32·7	36·9	—4·2	—11	—0·6	— 1	+0·4
Hyderabad ...	26·3	26·3	0	0	—0·8	+ 1	+0·1
Mysore	25·2	23·0	+2·2	+10	—0·7	+ 2	+0·3
Madras	27·4	24·2	+3·2	+13	—0·6	+ 1	+0·1
Mean of India when the size of the above areas is taken into account.	37·3	35·3	+2·0	+ 6	—0·8	+ 2	+0·2

Sub-division.	Rainfall, June to September.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	61·9	60·1	+1·8	+3
2. Lower Burma	102·9	99·2	+3·7	+4
3. Upper Burma	28·3	28·0	+0·3	+1
4. Assam	61·40	64·5	—3·1	—5
5. Eastern Bengal	72·8	62·9	+9·9	+16
6. Bengal	53·4	44·7	+8·7	+19
7. Orissa	47·0	44·0	+3·0	+7
8. Chota Nagpur	47·5	44·9	+2·6	+6
9. Bihar	47·7	42·1	+5·6	+13
10. United Provinces, East	37·6	35·4	+2·2	+6
11. Do. do. West	36·5	34·5	+2·0	+6
12. Punjab, East and North	25·6	18·7	+6·9	+37
13. Punjab, Southwest	8·2	6·1	+2·1	+34
14. Kashmir	15·9	11·8	+4·1	+35

Sub-division.	Rainfall, June to September.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
15. North-West Frontier Province ...	12·3	8·6	+3·7	+43
16. Baluchistan	1·7	2·1	—0·4	—19
17. Sind	5·7	5·5	+0·2	+4
18. Rajputana, West	16·3	10·7	+5·6	+52
19. Do. East	25·4	22·3	+3·1	+14
20. Gujarat	34·1	33·5	+0·6	+2
21. Central India, West	31·8	32·3	—0·5	—2
22. Do. East ...	34·9	41·0	—6·1	—15
23. Berar	26·3	27·2	—0·9	—3
24. Central Provinces, West ...	33·9	41·3	—7·4	—18
25. Do. do. East ...	42·5	47·5	—5·0	—11
26. Konkan	108·5	105·6	+2·9	+3
27. Bombay Deccan	24·5	25·0	—0·5	—2
28. Hyderabad, North	27·2	30·2	—3·0	—10
29. Do. South	25·5	23·0	+2·5	+11
30. Mysore	25·2	23·0	+2·2	+10
31. Malabar	102·3	102·8	—0·5	0
32. Madras, Southeast	15·3	11·9	+3·4	+29
33. Do. Deccan	20·2	14·7	+5·5	+37
34. Do. Coast, North	27·2	24·3	+2·9	+12

The Retreating Monsoon Period, October to December.

General Summary.—As measured by the amount of rainfall over the land the monsoon current was weaker than usual and was, owing to peculiarities of pressure distribution, directed to an unusual extent to the Bay Islands, Burma and Eastern Bengal and Assam. Four storms, of which three were of great severity, visited the Bay and, aided by the pressure distribution, were instrumental in drawing aside the humid current from the peninsula to the regions constituting the eastern margin of the field of the Bay current. The most striking feature of the season was thus the almost complete failure of the autumnal rains over a large part of the peninsula.

No rain of any importance fell in Burma and the Andamans after December 7, which may therefore be regarded as the date of final withdrawal of the monsoon currents from the Bay.

Conditions were even more than usually settled in northwestern and central India until the 12th of December: but subsequently two remarkable bursts of rain took place over the greater part of northern and central India, and were brought about by cold weather disturbances of a somewhat unusual character.

The total precipitation of the period was greatly below the normal over practically the whole of the peninsula, the defect ranging up to as much as 8" or 55 per cent in Madras. There was a considerable deficit also over Gujarat, Central India, western Bengal and the east of the United Provinces. On the other hand the seasonal fall was unusually heavy for the time of year in Burma, Eastern Bengal, the Punjab, the North-West Frontier Province and Rajputana. In Assam, the west of the United Provinces, the Central Provinces, Sind and the hills of Baluchistan and Kashmir the total measurements coincided with or slightly exceeded the normal values.

This distribution of rainfall, although not quite satisfactory, was more favourable than that recorded in the corresponding seasons of the two previous years, when the rainfall was even lighter. The air was damper than usual throughout the period over the plains of northwestern India and very dry over Hyderabad in the first two months. The departures from normal of cloud and temperature were only feebly marked; the former was however inclined to be low and the latter to be high in most parts of the Indian region.

Burma.—The seasonal precipitation was unusually heavy, being in excess by $3\frac{1}{2}$" or 58 per cent in Upper Burma and nearly 6" or 68 per cent in Lower Burma. Humidity was somewhat high and the quantity of cloud decidedly greater than usual. Temperature was normal.

Northeast India, including Orissa.—The rainfall of the period was in large excess in Eastern Bengal, within 10 per cent of the normal in Assam and Bengal proper, and much lighter than usual in Orissa, Chota Nagpur and Bihar. The departures of temperature, humidity and cloud were generally small in amount.

The United Provinces, Central India, and the Central Provinces.—Rainfall was irregularly distributed, being in slight excess in Berar, the Central Provinces east and the United Provinces west, exactly normal in the Central Provinces west and in defect by more than an inch or 52 per cent in the United Provinces east. Temperature, humidity and cloud differed little from the average.

Northwest India.—Precipitation was exactly or nearly normal in Sind and Baluchistan, in defect by about an inch or 75 per cent over Gujarat and unusually abundant in the rest of the division.

As was the case in the corresponding period of 1908, the air in the plains was damper than usual throughout. Skies were unusually clear in Kashmir, but elsewhere the cloud proportion was aboute qual to the average. Temperature differed by less than 1° from the normal except in Sind ($1\frac{1}{2}$° in excess).

The Peninsula.—The period was exceedingly dry all over the division. The deficit was more than 3" in amount over three-fourths of the area and was absolutely greatest in Madras southeast and Madras coast north, which obtained 9" and 4" respectively in place of the normal 18" and 12". The shortage was thus serious.

The quantity of cloud was generally in slight defect. Temperature was nearly $1\frac{1}{2}^{\circ}$ above its mean value in Hyderabad, Mysore and Madras and normal in Bombay. The air contained about the usual amount of moisture except in Hyderabad, and there the percentage of saturation was 8 below the average.

Division.	Retreating South-West Monsoon Period, October to December.						
	Rainfall.				Departure from normal of		
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.	Mean temperature.	Relative humidity.	Cloud.
	"	"	"		°		
Burma	11·8	7·3	+ 4·5	+ 62	+ 0·2	+ 4	+ 0·9
Eastern Bengal and Assam.	8·0	6·1	+ 1·9	+ 31	+ 1·1	— 2	0
Bengal	2·9	4·2	— 1·3	— 31	+ 0·7	— 2	— 0·1
United Provinces ...	1·3	1·8	— 0·5	— 28	+ 0·5	— 1	— 0·1
Punjab	1·7	0·8	+ 0·9	+113	+ 0·6	+ 5	— 0·6
North-West Frontier Province.	2·0	1·2	+ 0·8	+ 67	+ 0·9	+ 5	— 0·3
Sind	0·2	0·2	0	0	+ 1·5	+12	+ 0·1
Rajputana ...	1·0	0·7	+ 0·3	+ 43	— 0·6	+ 6	— 0·3
Bombay... ...	1·5	3·7	— 2·2	— 59	+ 0·1	0	— 0·4
Central India ...	0·8	1·6	— 0·8	— 50	+ 0·8	0	+ 0·4
Central Provinces ...	2·9	2·5	+ 0·4	+ 16	+ 0·4	— 2	+ 0·3
Hyderabad ...	0·6	4·1	— 3·5	— 85	+ 1·4	— 8	— 0·4
Mysore	6·7	7·8	—1·1	— 14	+ 1·6	0	—1·0
Madras	6·5	14·5	—8·0	— 55	+1·5	— 3	—0·4
Mean of India when the size of the above areas is taken into account.	3·8	4·4	—0·6	— 14	+0·6	0	—0·6

Sub-division.	Rainfall, October to December.			
	Actual.	Normal.	Departure from normal.	Percentage departure from normal.
	"	"	"	
1. Bay Islands	30·4	19·6	+10·8	+55
2. Lower Burma	14·6	8·7	+5·9	+68
3. Upper Burma	9·5	6·0	+3·5	+58
4. Assam	6·5	6·2	+0·3	+ 5
5. Eastern Bengal	9·6	5·9	+3·7	+63
6. Bengal	4·1	4·5	—0·4	— 9
7. Orissa	4·0	6·9	—2·9	—42
8. Chota Nagpur	1·5	3·3	—1·8	—55
9. Bihar	1·5	2·9	—1·4	—48
10. United Provinces, East	1·1	2·3	—1·2	—52
11. Do. do. West	1·5	1·3	+0·2	+15
12. Punjab, East and North	1·9	0·9	+1·0	+111
13. Punjab, Southwest	1·0	0·4	+0·6	+150
14. Kashmir	3·3	2·5	+0·8	+32
15. North-West Frontier Province ...	2·0	1·2	+0·8	+67
16. Baluchistan	1·4	1·5	—0·1	— 7
17. Sind	0·2	0·2	0	0
18. Rajputana, West	0·7	0·4	+0·3	+75
19. Rajputana, East	1·1	0·8	+ 0·3	+37
20. Gujarat	0·3	1·2	—0·9	—75
21. Central India, West	0·8	1·2	—0·4	—33
22. Do. do. East	0·8	2·3	—1·5	—65
23. Berar	3·2	2·6	+0·6	+23
24. Central Provinces, West ...	2·4	2·4	0	0
25. Do. do. East ...	3·1	2·7	+0·4	+15
26. Konkan	1·6	5·4	—3·8	—70
27. Bombay Deccan	2·1	4·7	—2·6	—55
28. Hyderabad, North	0·9	3·9	—3·0	—77
29. Do. South	0·3	4·3	—4·0	—93
30. Mysore	6·7	7·8	—1·1	—14
31. Malabar	11·5	15·0	—3·5	—23
32. Madras, Southeast	8·8	18·0	—9·2	—51
33. Do. Deccan	1·1	7·4	—6·3	—85
34. Do. Coast, North	3·9	11·9	—8·0	—67

European Troops.

(For Statistical Tables, *see* pages 133 to 137).

India.

The average daily strength of the European troops in India during 1909, excluding officers, was 71,556 and notwithstanding a legacy of chronic malaria left from 1908 their health was exceptionally good. The statement in the margin gives the chief rates for 1909. All were the lowest ever recorded for the European army in India and it is noteworthy that every chief disease, except influenza, shared in the decrease of sickness. The chief cause of mortality was, as usual, enteric fever, but as compared with 1908 more than 33 per cent of the decrease in the total death rate was due to the lessened mortality from that disease, only 113 deaths being recorded from it as compared with 190 in that year. From all causes only 649 men were invalided as compared with the previous year's total of 1,078. As a result of the very unhealthy autumn of 1908 malaria was the chief cause of invaliding during 1909, the number invalided on account of it being 76. Valvular disease and disordered action of the heart caused 71 invalidings, tubercle of the lungs 66, mental diseases 50, ear diseases 49 and venereal diseases 34.

India.	All causes. Ratios per 1,000.		
	1903-07.	1908.	1909.
Admissions ...	879·4	839·5	716·9
Constantly sick ...	54·0	45·7	40·3
Deaths ...	10·51	9·78	6·25
Invalids ...	27·91	15·64	9·07

The causes of the present very low rates of sickness, death and invaliding merit fuller discussion than can be accorded to them here. One of them stands out as especially worthy of record and will now be indicated; others will be mentioned in the paragraphs relating to enteric fever, malaria, and venereal disease, these being the three diseases of most importance in the European army. If the annual rates of the last decade are compared with one another it will be apparent that the reduction during the last three years is remarkable not more for its degree than for its suddenness: it would seem as if a previously unknown or untried hygienic measure of great power had been brought into use. There is considerable evidence that such a supposition could be verified—that it is indeed the case that a measure untried until quite recently has been a very potent cause of the reduction in the rates. The measure referred to is personal or individual hygiene. It will not be denied that until quite recent years all sanitary effort for bettering the health of European troops in India had to be classed under the heading of public hygiene—the individuals concerned were viewed as irrational beings who could not or would not understand and profit by knowledge of methods by which they could help themselves to guard against infectious diseases. During the last few years a great change of opinion in this connection has occurred, and while we know that the old ideal of military hygienists was to free the surroundings of the soldiers from all infectious germs, we may suppose that the new ideal is to inculcate such knowledge into the soldiers that it is of little consequence whether their surroundings are free from germs or not. The annual reports by medical and sanitary officers contain the evidence

that justifies this view. We read that in many stations combatant officers have associated themselves with medical officers in a common endeavour to teach the soldiers how to guard against enteric fever, malaria, and venereal disease. As regards enteric fever we learn that leaflets are issued to the men, that lectures are always followed by a great increase in the numbers of those who come forward to be inoculated, and that a knowledge of the principles underlying this method of protection has enabled the men better to realise its benefits. As regards malaria we know that in a number of regiments, officers and men have combined to employ a part of the regimental funds for the provision of mosquito curtains, that large numbers of men of their own accord employ quinine as a prophylactic regularly and in an intelligent manner, and that where mosquito destruction operations are concerned few are more enthusiastic in the campaign than the average British soldier. As regards venereal disease we are aware that the lectures and talks to the men regularly given by combatant and medical officers have been probably of all the measures ever tried the most effective in bringing about the remarkable reduction that has occurred. We read also that increase of knowledge has made men feel that to contract venereal disease is disgraceful to themselves and to their regiments, and we learn that a knowledge of the principles and results of the method of continuous and long treatment now adopted is much appreciated and that as a consequence it happens not infrequently that men who have contracted syphilis extend their term of service in order to obtain the full course of treatment. Finally we are aware that among the many factors that have tended towards the diminution of disease generally and of certain diseases in particular, the influence of the widespread increase of temperance among European soldiers in India has been of great importance. These remarks are sufficient to indicate that the seeds of personal or individual hygiene are not being sown on barren ground when they are spread among the European army in India, and that the plan which from its recent adoption may not inappropriately be termed " the new hygiene for European troops " has proved to be a reasonable and efficacious method of preventing disease.

Northern and Southern Armies.

The relative healthiness of the troops comprising the Northern and Southern armies can be ascertained very easily with the aid of Table 1-A to this section. The greater amount of sickness and mortality in the Northern army is noteworthy, and from the statistics in Table II it will be seen that except venereal disease nearly all the chief diseases contributed to the increase. The feature of the statistics relating to Divisions (Table 1-A) is the great reduction of the figures under all headings as compared with the figures of 1908. The statistics of troops in the Quetta, Poona and Rawalpindi Divisions were more favourable than in the other Divisions during 1909.

Only twelve stations as compared with 22 last year come in the list of those that, according to the statistical method adopted in this report, are to be regarded as having been especially unhealthy during the year. Full abstracts of the sanitary reports on these stations will be found in Table V,* so it is not necessary to do more than draw attention to them here. As regards the prevalence of important diseases in plains stations where the average annual strength was 500 or more, the incidence of enteric fever was greatest at Meerut, Kirkee, Lahore, Lucknow and Sialkot; of malaria at Agra, Ferozepore, Meerut and

* When a Table or appendix is marked with an asterisk it refers to the standard tables or appendices of the Sanitary Commissioner's Annual Report.

Multan; of dysentery at Kirkee, Lucknow, Bangalore and Dalhousie; and of venereal diseases at Rangoon, Bellary, Fort William and Colaba.

Geographical groups.

In the tables appended to this report will be found the statistics of European troops arranged according to the areas into which India has been divided from the meteorological and physiographical points of view. It will be seen that the rates of admission to hospital were lower than in the previous year in eight of the 12 groups. The Burma Coast and Bay Islands group where the admission rates from a number of the principal diseases were higher than in 1908, contains only the stations of Rangoon and Port Blair. Malaria, pyrexia of uncertain origin, and venereal diseases were the chief causes of the increased rate. The higher admission rate for the year in the Gangetic Plain group was due to the greater amount of sickness in only three of the seven stations in the group, namely, Cawnpore, Lucknow and Dinapore; but in these stations as well as in the group as a whole the death rates were very much lower than in 1908; in Cawnpore the death rate fell from 18·78 to 2·09, in Lucknow from 13·45 to 7·03 and in Dinapore from 12·78 to 5·56. Also in the Western Coast group although the admission rate was slightly higher than in 1908 the death rate fell from 10·10 to 7·85. The Hill Convalescent Depots and Sanitaria was the only other group in which an increased admission rate was recorded for 1909 and in this group it was due chiefly to the relapses of malaria from which men who had contracted the disease in the autumn of 1908 continued to suffer.

Cholera.

Cholera caused twelve admissions to hospital and seven deaths as compared with 93 admissions and 76 deaths in 1908. The stations at which the cases occurred were Secunderabad, Belgaum, Dinapore, Kampti, Ahmednagar, Amritsar and Thayetmyo. Five of the cases occurred at Secunderabad among the men of a patrol employed on field manœuvres the previous day. At first ptomaine poisoning was suspected, but the patients had had no food except the usual rations that had been served out to the whole regiment. It was found that the five men had drunk muddy water from a small tank close to a village. The only other station with more than one case was Belgaum in which there were three, two occurring on the 23rd of June and one on the 29th. The place of origin was not discovered.

Small-pox.

Small-pox was less prevalent among the civil population than in 1908, and among European troops only 19 cases were recorded as compared with 53 in that year. There were five cases at Mhow, four each at Fort William and Poona, two at Bangalore and one each at Campbellpore, Ambala, Kirkee and Dalhousie. The only fatal case occurred at Fort William (Calcutta) where a conductor in the Indian Ordnance Department who had been revaccinated 26 years previously died from the confluent type of the disease.

Malaria.

In India generally the year 1909 was not unusually malarious, but a large number of soldiers who had contracted the disease in the very unhealthy autumn of 1908 continued to suffer frequently from relapses during the months between January and June, and for this reason the statistics do not show the marked reduction that might have been expected. The admissions to hospital numbered 14,511 (203 per thousand) as compared with 16,824 (244 per thousand) in 1908,

but there were 6,909 cases treated "in barracks" as compared with 6,703. The deaths numbered 26 as compared with 35 and the invalidings to England 76 as compared with 62. The relative monthly incidence of the disease during the two years is shown in the following tabular statement :—

Annual admission rates per 1000, from malaria, by months.

—	—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1908 ...	Admissions to hospital.	76·8	55·2	62·4	73·2	98·4	117·6	145·2	259·2	588·0	693·6	481·2	274·8
1909 ...		180·0	92·4	124·8	163·2	195·6	207·6	266·4	278·4	261·6	260·4	241·2	156·0
1908 ...	Treated in barracks.	33·5	22·7	28·1	28·8	32·4	45·9	56·7	59·7	206·4	256·7	241·3	157·4
1909 ...		109·1	75·8	69·6	86·3	109·7	106·8	100·6	101·7	103·1	116·7	107·4	71·2

Taking into consideration all the statistics just detailed it is plain that relapses were the dominant feature of 1909. To their influence must be attributed the rise in the admission rates from malaria not only in hill stations and sanitaria such as Landour, Gharial, Cherat, Dalhousie, Jutogh, Darjeeling and Murree to which many of the less robust soldiers were sent in the early months of the year, but also the rise in a number of stations in the plains. Thus at Jullundur the admission rate for 1909 was 522 per thousand as compared with only 349 in 1908, but from Table X* we learn that considerably more than half the total admissions for the year occurred from January to April, a period when this station may be said to be almost free from mosquitoes and new infections. The medical officer attributed the large number of cases to the arrival of a regiment that had suffered severely from malaria in Amritsar during the previous autumn. At Fort William, Ambala, Nowshera, Muttra, Colaba and some other stations, a similar change in the usual incidence of admissions to hospital from malaria occurred. At Colaba the considerable incidence during the first half of the year was attributed to the arrival of the 1st Gloucestershire regiment from Lahore Cantonment (Mian Mir). It is said that this regiment suffered so severely from malaria until the end of June that it was considered unfit for active service.

From the above remarks it will be seen that the year was one in which curative measures held a very important place in the campaign against malaria and it was doubtless of great advantage to the troops that a careful system of "after treatment," to which reference has been frequently made in previous issues of this report, is now adopted at all stations. The following is an abbreviated account of the arrangements carried out at some of the hill stations during the year. From the details given in medical history sheets and by enquiry a nominal roll was prepared of all men who had been attacked with malaria during the previous autumn. Medical inspections enabled these men to be divided into three classes, namely, (1) men found to be fit for all duties; they received no medicine, but had to attend at the hospital once a month to be weighed and to report whether they had had fever or not, (2) men found to be fit for light duties; they were weighed every week and had to attend at the hospital twice a week to receive a dose of quinine, (3) men found unfit for duty; they attended for medicine daily at the hospital for from six weeks to three months as might be necessary. At Campbellpore the system of "after

treatment " was to administer 15 grains of quinine on Thursdays and 10 grains on Sundays for six weeks, and there was only one case of relapse among 52 men so treated. At Gharial where the 1st Northumberland Fusiliers arrived in a very bad state of health from Peshawar, it is said that 62 men were treated by intramuscular injections of 10 grains of quinine once a week for ten weeks " with excellent results." Another measure very necessary in a year like 1909 was the discovery and special treatment of all soldiers who though apparently well and performing all their duties were found to have malaria parasites in their blood. A systematic search for such " malaria carriers " was made at Ferozepore and among 211 men whose blood was examined with that object 16 were found to have malignant tertian parasites in their blood and 9 were found to have benign tertian parasites. All the men examined were performing their duties and were supposed to be taking prophylactic doses of quinine. The plan of segregating all malaria patients and obliging them to sleep under mosquito curtains was adopted in a large number of stations. The measures taken to prevent new infections were of the same kind as in recent years, but the good results attending measures classed under the heading " prophylaxis for the individual " are becoming more widely recognised and applied. The use of mosquito curtains by a large proportion of soldiers is mentioned in the annual reports relating to Peshawar, Lahore, Rawalpindi, Agra, Delhi, Dum Dum, Benares, Nasirabad, Neemuch and Pachmarhi. In Lahore nets were used by all men doing duty in the Fort and the medical officer strongly recommended their issue to everyone in the Cantonment. The medical officer at Rawalpindi reports that every man in the garrison was provided with a mosquito net, that the cost of each net with poles was 4 rupees and that half the amount was paid by the men themselves and half from the regimental funds. He states that the ideal way of passing the nights during the hot weather in Rawalpindi is to sleep in the open under a mosquito net, and considers that this should be enforced for everyone. Punkhas are not required if one sleeps in the open. At Agra mosquito nets were used by all men in the Fort and the medical officer reported his conviction that mechanical protection by netting will eventually prove the chief factor in ensuring a permanent decrease in the incidence of malaria. At Dum Dum the cost of a net and poles was 3 rupees and at Nasirabad 3 rupees eight annas. In the latter station the regiment and batteries provided the curtains at their own expense. Quinine prophylaxis was, as usual, carried out in nearly every station during the malarious season. There is little that is new to be recorded about the arrangements for administration. The Principal Medical Officers of several Divisions considered that reported failures by this method are usually a sign of faulty administration of the drug, and at one or two stations the medical officers reported that non-commissioned officers cannot in all cases be relied upon to see the prophylactic doses given. The importance of superintending personally the dispensing of the quinine solution is referred to at one station. To give the drug in solution is considered by the majority of medical officers to be far more efficacious than to give it in tablet form and several refer to the great advantage of adding to the solution small doses of magnesium sulphate or other drug that will bring about an increase in the flow of bile. In view of our knowledge that quinine is readily soluble in bile this is an important point. Nearly all medical officers agree that soldiers seldom or never object to take quinine prophylactically—indeed it is not improbable that some soldiers take more quinine than is good for them—but several report that men object to attend special

parades to receive the prophylactic doses. The only other measure of individual prophylaxis that need be mentioned was the institution of an experimental segregation camp for healthy men at Ferozepore. Seventy-five men occupied the camp from the 18th of September until the 25th of October. No mosquitoes were found in the tents but sandflies were numerous. The men were in excellent health during their stay in camp. As regards measures of general prophylaxis the usual efforts to limit the number of mosquitoes by minor antilarval methods were carried out with thoroughness and zeal at nearly all stations in the plains, but in the absence of initial investigation it is not possible to say whether these measures had any effect.

Pyrexia of uncertain origin.

There were 4,386 admissions to hospital and one death recorded under the heading pyrexia of uncertain origin during 1909 as compared with 5,096 admissions in 1908, but a larger number of these cases were treated "in barracks"—2,165 as compared with 1,526. The heading is used by most medical officers as a substitute for the heading simple continued fever that was removed from the annual returns at the end of 1907. A number of the cases during 1909 were malarial in origin, but at Peshawar and a few other stations a considerable proportion of them were considered to be cases of phlebotomus or sandfly fever. In this belief the medical officer at Peshawar did not feel justified in returning them as pyrexia of uncertain origin and chose the heading influenza, which appeared to him to be the heading in the Nomenclature of Diseases that best indicated the symptoms present. This explains the statistical prevalence of influenza (365 cases) at Peshawar during 1909. In the returns for 1910 it will not be necessary to adopt an alternative of this kind because a new heading "phlebotomus or sandfly fever" has been added.

Malta fever.

Only one admission to hospital during 1909 was due to Malta fever as compared with three in 1908, five in 1907, and seven in 1906. The case occurred at Ranikhet. It was said that the patient had had several attacks previously.

Kala-Azar.

Five cases of kala-azar with two deaths were recorded among European troops during the year, as compared with four cases and one death in 1908. Two of the cases occurred at Lucknow and one each at Sitapur, Darjeeling and Wellington. The patients at Lucknow were said to have contracted the infection in Dum Dum and the patient at Wellington in Burdwan. In all the cases the diagnosis was confirmed by finding the parasite.

Enteric fever.

The statement in the margin shows at a glance the number of admissions to hospital, the number of deaths, and the admission and death rates per thousand of average strength, recorded from enteric fever among European troops in India during each of the last five years. It will be seen that the indications of a diminution of the admissions and deaths shown in the figures for 1907 and 1908 culminated in a remarkable and sudden fall in the numbers and rates in 1909; the admission rate was lower than in any year since 1883 and the death rate was lower than in any

Years.	Admissions.	Deaths.
1905 ...	1,146	213
	16·1	*2·99*
1906 ...	1,095	224
	15·6	*3·19*
1907 ...	910	192
	13·1	*2·77*
1908 ...	1,001	190
	14·5	*2·76*
1909 ...	639	113
	8·9	*1·58*

year since 1875. The average number constantly sick was less by about 37 than in 1908 and the total loss of service due to the disease was less by 13,730 days. A further remarkable feature of the statistics was the much lower case mortality. Among 7,635 cases during the years from 1898 to 1902 the fatality was 23·4 per cent and among 6,955 cases during 1903 to 1907 it was 17·1 per cent. In 1908 taking into account the cases that remained under treatment at the end of 1907 the figure was 17 per cent and in 1909 it was only 14 per cent.

In the Northern army the admission rate for 1909 was 10·9 per thousand and the death rate 2·11 per thousand; in the Southern army the rates were only 6·8 and 1·05 respectively. The difference is not unusual and is due to the fact that in Burma and in many parts of the Madras Presidency enteric fever is not prevalent among European troops. As regards Divisions the incidence of the disease was greatest among troops in the 8th (Lucknow) and 7th (Meerut) Divisions, and least among troops in the 10th (Burma) and 4th (Quetta) Divisions. In all except one of the Geographical Groups the admission rates were lower than in 1908.

In the absence of statistics relating to regiments the greatly diminished prevalence of the disease is best indicated in the statistics of stations. We find that in 1908 there were eleven stations in which admission rates of over 30 per thousand were recorded, but that in 1909 the convalescent depot of Naini Tal was the only station where the rate was higher than this. Excluding Naini Tal the highest rate recorded in any station was 28·3 in Benares. In a number of stations the fall in the number of cases as compared with 1908 was great, as for example from 93 to 21 in Rawalpindi, from 80 to 20 in Secunderabad and from 52 to 18 in Peshawar.

The largest numbers of cases occurring in stations during the year were 56 in Lucknow and Meerut and 30 in Lahore; in 1908 the largest numbers were 93 in Rawalpindi and 80 in Secunderabad.

Causes of the reduction.

The reduction of enteric fever naturally forms the chief topic of comment by medical and sanitary officers. "Enteric fever will soon cease to be a serious cause of disability" is evidently the idea that is uppermost in the minds of those officers, and the idea, optimistic though it is, is justifiable not only because a great reduction has already occurred, but also, and chiefly, because we believe we know the measures by which the reduction has been effected. Those measures differ essentially from the various expedients which in years gone by were the only resources available, in that they are not empirical attempts to attack what are thought (chiefly on general grounds) to be the vehicles of infection in the environment, but are founded upon the firm basis of knowledge derived from investigation. In view of the importance of the change of method it is not out of place to recall the chief events that led up to it. It had always been intended that the cause and prevention of enteric fever among European troops in India should be the first enquiry undertaken at the new Central Research Institute, and in 1903 the late Professor Koch's brilliant discoveries regarding enteric fever in Alsace-Lorraine indicated the line that the enquiry should follow. It was essential that Professor Koch's methods should be studied on the spot and with that object the Sanitary Commissioner made arrangements in 1905, through Professor Kossel of the University of Giessen, to visit the scene of

the work. The necessary permission from the authorities in Germany arrived too late to enable him to carry out the proposed plan and he therefore suggested to Captain E. D. W. Greig, I.M.S., that he should endeavour to do so. On the Sanitary Commissioner's recommendation the Government of India sanctioned Captain Greig's deputation to Germany in the autumn of 1905, and on his return to India the enquiry at the Central Research Institute was commenced under the direction of Lieutenant-Colonel Semple (the Director of the Institute) and Captain Greig in April 1906. The results of the enquiry were far-reaching and promised to settle most of the vexed problems regarding enteric fever among European troops in India. In July 1906 the Government of India, on the recommendation of His Excellency the Commander-in-Chief, approved the formation of a Standing Committee on enteric fever, the Principal Medical Officer, His Majesty's Forces in India, being President. With this Committee's assistance practical effect was given to the recommendations arising from the results of the enquiry at the Central Research Institute. The chief results and recommendations were: (1) "As a considerable proportion of convalescents from enteric fever harbour and excrete typhoid bacilli, sometimes for long periods, they are a source of danger to troops. It is, therefore, strongly recommended that accommodation be provided in the hills for isolating enteric fever convalescents away from other troops. The places selected for this must have at their command bacteriological laboratories where cultivations from the excreta can be made daily to determine when the individuals are free from infection: also efficient means for disinfection." (2) "It has been proved that a proportion of those who have suffered from enteric fever either in a form recegnised as such or so slightly as to escape recognition and of those who have been in close contact with them harbour and excrete typhoid bacilli for considerable periods while showing no symptoms of illness. The handling of food by such persons is a great source of danger to others, and outbreaks of the disease have been definitely traced to this source. It is, therefore, strongly recommended that all men, British or Native, whom it is proposed to employ in connection with food intended for Britith troops, in kitchens, officers' and non-commissioned officers' messes, regimental dairies, bakeries, mineral water factories, etc., should first be medically examined to detect and prevent the employment of any who may be harbouring the infection of enteric fever. No man who has recently suffered from enteric fever should be so employed until it has been placed beyond all doubt, by repeated bacteriological examinations, that he no longer harbours the *B. typhosus*." (3) "As it is found that orderlies nursing enteric fever patients suffer from the disease in considerably greater proportion than other men, and that a certain number of cases occur in patients under treatment in hospital for other diseases, it is recommended that, (*a*) all such men not protected by a previous attack of the disease should be inoculated and the operation repeated when one year has elapsed since the previous inoculation; (*b*) in selecting men for such employment preference should be given to those whose age and service in India make them less liable to infection; (*c*) orderlies nursing enteric fever patients should not be allowed at the same time to attend other patients." (4) "The present system of employing soldiers of combatant units for nursing enteric fever patients is considered a great danger, these men mix freely with their comrades and at short intervals return to duty with their units. A certain number have been found to be harbouring the *B. typhosus* in their bodies without suffering from any symptoms of disease, but capable of spreading enteric fever to others. To avoid what may be a frequent means of spreading the disease, it is considered

urgently necessary that a special corps of male nurses should, as soon as possible, be instituted."

Upon these recommendations a very effective campaign of attack is being gradually instituted. The opening of the Naini Tal depot for enteric fever convalescents was described in last year's report. The number of men received at this depot from April 1908 until the end of 1909 was 655 of whom 550 underwent the bacteriological examinations necessary for the detection of carriers. Six chronic bacillus-carriers were detected during 1908 and seven during 1909. The second convalescent depot was officially declared open at Wellington in June 1909, but convalescents had been received for several months before that date. During the last six months of the year 123 men were dealt with, of whom 64 underwent complete bacteriological examination and were discharged to duty, 10 were discharged time-expired before the examinations upon them were completed and 49 were still undergoing examination at the end of the year. One man was found to be an intermittent chronic carrier.* It has to be remembered that all convalescents are kept at these depots more than four months so that it is necessary to discover only those men who excrete the bacilli longer than this, and that even if no bacillus-carrier of this class were discovered, the accomplishment of the primary object of the depots, namely the removal of enteric fever convalescents from their stations and their segregation where they cannot be a danger to others would fully justify the establishment of the depots. The reports by medical and sanitary officers contain evidence that the second of the recommendations, namely the thorough examination of everyone who has to handle the food for European soldiers, has received full attention and that those examinations are in a number of stations extended to the Native as well as to the European staff. The third recommendation, relating to orderlies nursing enteric fever patients, is being carried out in its entirety, and although the fourth recommendation, that a special corps of male nurses should be enlisted, has not yet been adopted, the teaching now given to nursing orderlies and the stringent rules with which they comply in regard to disinfection and other measures for preventing the spread of enteric fever by their agency must have minimized the danger referred to in the recommendation. There are still two other measures to be referred to among those that have come about as a direct result of scientific investigation. The first is the plan of seeking for men who may be suffering from enteric fever, instead of waiting until the patients feel ill enough to go to hospital. To this end frequent inspections are held, and whenever a case of enteric fever has occurred, a special investigation of contacts and others is made to ascertain by bacteriological examination whether an ambulant or mild case or a person who is excreting bacilli without manifesting symptoms has remained undetected. During 1909 in Nowshera, Peshawar, Multan, Sialkot, Bareilly, Nowgong, Poona and a few other stations such investigations included the examination of Natives as well as Europeans. The second measure is anti-typhoid inoculation. The material and methods for this voluntary measure have been greatly improved during recent years and especially during 1909 the efforts to popularize it were responded to by officers and men in a very encouraging manner. It is satisfactory also that information relating to this subject is now being collected in a way that will enable the results to be treated by modern statistical

* In the fæces of two other convalescents typhoid bacilli were found once. In the first of these cases the interval between the cessation of fever and the discovery of the bacilli was 2½ months and 73 subsequent examinations made during the five months following the discovery were negative. In the second case the interval was 3½ months and 30 subsequent examinations made during the two months following the discovery were negative.

methods. The purpose of the new plan is to ensure that, on certain stated dates during the year, a census relating to each corps or unit in India will be carefully taken under the headings shown in the statement below. The returns on this plan were first made on the 30th September 1910 and from them the following summary has been compiled :—

Name of corps or unit.	Total men present on the day this census is taken.	Total present who have been properly inoculated at any time before the day this census is taken.*	Total present who have been inoculated and not afterwards attacked.†	Total present who have been inoculated but afterwards attacked.†	Total present who are uninoculated and unattacked.	Total present who are uninoculated but have been attacked.
1	2	3	4	5	6	7
Cavalry	5,440	3,602	4,175	140	855	159
Royal Field Artillery ...	7,490	4,055	5,462	101	1,602	313
Royal Garrison Artillery ...	4,015	1,977	2,509	36	1,320	134
Royal Horse Artillery ...	1,892	1,230	1,421	26	356	84
Ammunition Column ...	596	303	387	11	171	38
Royal Engineers	113	19	22	0	78	10
Infantry	49,215	34,752	40,704	668	6,735	969
Staff and Departments ...	878	193	268	10	557	41
Attached Corps	854	317	420	10	400	23
India ...	*70,493*	*46,448*	*55,368*	*1,002*	*12,704*	*1,771*

* By properly inoculated is meant that the man has received two or more doses of vaccine; men who have received only one dose are excluded from this column.

† In these columns men who have received only one dose of vaccine are included.

Unfortunately at some stations the instructions that accompanied the form were misunderstood and for this reason it has especially to be noted that the figures are not strictly accurate, but the information is the best at present available. For the next census, which is due to be taken on the 31st December 1910, complete instructions dealing particularly with the points in regard to which errors were made have been issued, and that census, it is hoped, will provide an accurate record. It will be seen that the data in columns 4 to 7 are such as will enable the correlation coefficients to be worked out by the "four-fold table" method described by Professor Pearson, and this will be done on the figures for the next or a subsequent census in regard to which it may be found that the data are, as far as can be judged, strictly accurate. In the meantime it must suffice to refer briefly to some other considerations that tend to show the value of anti-typhoid inoculation. A close examination of the annual reports by medical officers for 1909 has shown that without exception all those officers are convinced of the great value of the measure. Unanimous opinion of this kind is of considerable importance, especially if it is possible to analyse the observations upon which it is based. Doubtless it is based upon the frequent observation that if inoculation sometimes fails to prevent enteric

fever it at the least may be relied upon to mitigate its course and in a large proportion of cases to prevent death. Dealing with the statistics for 1909 only, the following is the nature of that kind of evidence. (1) In order to ascertain whether inoculation mitigates the severity of the disease we may examine for inoculated and uninoculated patients respectively the duration of fever and the frequency of complications. For 1909 this information is available in regard to 170 inoculated and 455 uninoculated patients, but it is clear that in some instances medical officers have recorded the number of days in hospital instead of the number of days of fever and that this has been done a little more frequently for inoculated than for uninoculated cases. For these reasons it happens that the mean duration of fever in the inoculated patients works out to 23·01 days and in the uninoculated patients to 23·75 days, both figures being high and very similar. In order to interpret the statistics correctly they must be treated by a method which is uninfluenced by the presence of the extreme values, and this can be done by ascertaining the frequency distribution of the days relating to inoculated and uninoculated cases respectively. The results by this method show that for inoculated cases the "mode" (which is the technical term for the most likely event) is 15—16 days, while for uninoculated cases it is 21—22 days. We may say, therefore, that in 1909 the type of an inoculated case of enteric fever was one in which the fever lasted 15—16 days and that the type of an uninoculated case was one in which the fever lasted 21—22 days; the analysis supports the view of medical officers that the commonest result is for the duration of fever in an inoculated case to be considerably less than in an uninoculated case. The statistics relating to complications show, also, that hæmorrhage and perforation are considerably less likely to occur in an inoculated than in an uninoculated patient. As regards the prevention of death it is sufficient to say that in 1909 the case mortality of inoculated patients was only 9·5 per cent as compared with a case mortality of nearly 20 per cent for uninoculated patients. Finally the following argument may be noted for what it is worth. The figures upon which the ratios for enteric fever among women are based are very small, but unless steps to provide inoculation for the women of the European Army in India are shortly taken we may in a few years have a table similar to that which now supplies such a good proof of the value of vaccination. So far as information is available it appears that none of the 40 women who contracted enteric fever during 1909 had been inoculated and from the statements of some medical officers in their annual reports it is believed that the operation is not carried out among them. It may, of course, be a coincidence that during 1909, for the first time in the history of enteric fever in India, the admission rate among women was higher than among men and that the death rate was very nearly as high, but if this remarkable change of relative incidence is frequently shown

Relative incidence of enteric fever among men and women of the European Army in India. Admission and death rates per 1,000 of strength.

Years.	Admission rates.		Death rates.	
	Men.	Women.	Men.	Women.
1898 ..	36·3	12·2	10·00	4·81
1899 ...	20·6	5·8	5·14	2·26
1900 ...	16·0	7·6	4·77	2·41
1901 ...	12·8	7·0	3·32	3·30
1902 ...	16·7	7·8	4·29	1·96
1903 ...	19·6	8·6	4·18	2·42
1904 ...	19·7	8·7	3·76	·93
1905 ...	16·1	8·6	3·00	1·48
1906 ...	15·6	7·3	3·19	1·46
1907 ...	13·1	8·9	2·77	1·72
1908 ...	14·5	13·3	2·76	1·89
1909 ...	8·9	10·2	1·58	1·53

in future years it will be difficult to find a sufficient reason for it except the reason that inoculation is carried out among the men but not among the women.

The above remarks indicate that probably it is correct to attribute to the benefits of inoculation a considerable proportion of the reduction of enteric fever that has occurred, but we must avoid crediting that practice with the share that is rightly due to the sanitary measures already enumerated. The following table is of interest in this connection.

Enteric fever ratios per 1000.

Years.	Northern area.		Eastern area.		Western area.		Southern area. (Excluding Burma).	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1905	17·7	3·12	16·9	3·11	17·5	3·69	16·8	2·62
1906	13·0	2·62	18·0	3·71	17·6	4·08	18·5	3·17
1907	12·8	2·33	11·6	2·87	14·8	3·56	18·3	3·20
1908	20·4*	3·73*	12·6	2·70	11·7	2·18	16·7	2·70
1909	8·8	1·53	13·1	2·72	8·2	1·14	6·5	1·37

* Some of the troops were on Field service.

It will be seen that the Eastern area is the only one in which a marked fall in the rates did not occur in 1909. This area contains 23 stations and it is significant that during 1909 the enteric convalescents in no fewer than twelve of those stations were not sent to the Naini Tal or Wellington convalescent depots.

Of the general sanitary precautions which aim at securing the bacteriological purity of the numerous vehicles by which infection may be transferred it is scarcely necessary to say more than that they have been by no means neglected; it seems desirable rather to point out that in some stations there is still a tendency to concentrate attention and energy upon precautions that may or may not be of service to the neglect of some of the measures dealt with above that have been proved by bacteriological investigation to be those that aim at the root of the problem. To use cresol or perchloride of mercury during the day time in the latrines of a few British soldiers and to incinerate the excretal solids of a small proportion of the garrison certainly make for cleanliness and an absence of smells and of flies, but there is evidence that concentration of attention upon such efforts is sometimes accompanied by forgetfulness of the measures by which enteric fever is being reduced.

[*The yearly summary of literature upon enteric fever and commentary upon recent investigations is omitted from the present abstract.*]

Plague and some other diseases.

Among European troops in India there were five cases of plague with one death during 1909 as compared with two in 1908, eight in 1907, and seventeen in 1906. Four of the cases occurred at Mhow and one at Bangalore. The cases at Mhow occurred towards the end of an epidemic in the suddar bazaar when (according to report) the bazaar rats migrated into the cantonment and surrounding country. Measles caused 22 admissions to hospital and erysipelas 19, three cases of the latter disease being fatal. Only eight cases of beri-beri were recorded, all at Aden. Dengue, as usual, was reported almost entirely from Burma and Madras. Of the 221 cases 117 occurred at Rangoon. Rheumatic fever was responsible for 420 admissions to hospital and seven soldiers were invalided for this disease.

The total number of cases of tubercle of the lungs treated during the year was 81 and the deaths were nine, the corresponding figures in 1908 having been 93 and sixteen. The table in the margin shows the decrease that has occurred in the recorded figures for this disease during recent years. The cause of the decrease is not clear.

Tubercle of the lungs.

TUBERCLE OF LUNGS.

	Admissions.	Deaths.	Invalidings.
Mean of the years 1900 to 1904	212	28	116
1905	148	20	116
1906	114	12	92
1907	114	14	107
1908	93	16	73
1909	81	9	66

Pneumonia.

The admission and death rates from pneumonia in 1909 were 2·9 and ·31 per thousand respectively as compared with 3·9 and ·39 in 1908, the total numbers of admissions and deaths in each year being 209 and 22 in 1909 and 269 and 27 in 1908. The disease was considerably more prevalent in the Northern than in the Southern Army and comparing its relative incidence with that in 1908 it was less prevalent in eight of the geographical groups and more so in four. Excluding stations where the average strength was below 200, Lahore, Nowgong, Naini Tal, Peshawar, Barrackpore and Jullundur were the stations with the highest admission rates during 1909.

Respiratory diseases.

The heading respiratory diseases excludes pneumonia, which since 1908 has been classed, in accordance with the new edition of the Nomenclature of Diseases, as an infective disease. There was a decrease in the admission rate from 17·4 per thousand in 1908 to 12·8 in 1909, but the number of deaths rose from six to seven. The stations classed as hill convalescent depôts and sanitaria were those in which the diseases were most frequent. Of the seven deaths under the heading three were due to broncho-pneumonia.

Dysentery and Diarrhœa.

The admission and death rates from dysentery fell from 14·4 and ·42 per thousand in 1908 to 11·2 and ·25 in 1909. The death rate was twice as high in the Northern as in the Southern Army. The disease was most prevalent among troops in the 6th (Poona), 8th (Lucknow), and 9th (Secunderabad) Divisions and, as usual, among geographical groups the highest admission rate was recorded in the Southern India group (XI). For the European army as a whole the month of greatest prevalence was August and that of least prevalence, March.

There were 898 admissions with one death on account of diarrhœa as compared with 801 admissions and 18 deaths on account of dysentery. The admission rates were highest amongst troops in the Bengal and Orissa and Southern India geographical groups, and among the larger stations Dum-Dum, Delhi, and Aden were those at which the disease was most prevalent.

Hepatic abscess.

The marginal statement shows the total admissions to hospital and deaths from hepatic abscess in each of the last four years. The decrease is the more remarkable as the prevalence of dysentery, which is a very common antecedent of abscess of the liver in India, remains about the same as it was a number of years ago. It is coincident, however, with a remarkable and steady decline in the number of admissions to hospital from alcoholism. In 1909 there were only 65 admissions from that cause as compared with 71 in 1908,

	Abscess of liver.	
	Admissions.	Deaths.
1906	183	107
1907	165	70
1908	115	55
1909	100	34

94 in 1907, 170 in 1906, 197 in 1905, and an annual mean of 231 for the years from 1900 to 1904.

Venereal diseases.

The recorded admission rate for all venereal diseases in 1909 was 67·8 per thousand as compared with 69·6 per thousand in 1908 and there was only one death as compared with three deaths in that year. The constantly sick rate was 8·5 per thousand as compared with 8·8. Only 34 men had to be invalided for this cause as compared with 74 in 1908.

The causes to which the rapid and steady fall in the rates relating to these diseases are usually, and with good reason, attributed, have been referred to at length in previous issues of this report. In this issue attention has been specially directed to the more general application of the principles of personal hygiene and to the decreased indulgence in alcohol as factors of great importance in the reduction of a number of diseases. Venereal disease stands out as being pre-eminently a disease that has been very greatly influenced by these factors, for it is well known that in its prevention such measures as can be carried out by the State are effective only in proportion as the individuals comprising the community which it is desired to protect are themselves anxious and willing to avoid infection.

Venereal diseases are always less prevalent among troops serving in the north of India than among those serving in the south. In 1909, this difference of incidence was less marked than usual for the admission rate among troops of the Northern army was slightly higher than in 1908 (namely, 62·2 as compared with 58·3), and among troops of the Southern army it was a good deal lower (76·3 as compared with 84·1). As regards Divisions the admission rates were, as usual, highest among troops in the Burma and Secunderabad Divisions. Excluding stations at which the average strength was below 100, the highest admission rates were recorded as regards the Northern army at Fort William, Fyzabad and Ranikhet, and as regards the Southern army at Meiktila, Rangoon and Bellary.

The admission rate on account of gonorrhœa was 37·7 per thousand and that on account of soft chancre 13·9 as compared with rates of 37·8 and 16·1 respectively in 1908. Eight men as compared with 15 in the previous year were invalided for gonorrhœa during 1909.

It is mentioned by the medical officer at Ambala that quite a number of the cases of syphilis (and those of a severe type) were contracted prior to arrival in India.

Heat stroke.

The total number of deaths recorded as a result of heat stroke during 1909 was 15 as compared with 37 in the previous year and 26 in 1907. The stations at which most deaths from this cause occurred were Nowshera (3) Lahore Cantonment, Multan, Agra, and Aden (2 in each).

Suicide.

The mean annual number of suicides reported in the decade 1897 to 1906 was 20, and in 1909 the number was 21, of which seven were by gunshot, five by hanging, four by cut-throat, three by drowning and two by poison.

Invaliding.

From the European army of India 649 men were invalided in 1909 (9·07 per thousand of strength) as compared with 1,078 (15·64 per thousand) in the previous year. In the Northern army the rate was 9·97 per thousand and in the Southern army it was 8·59 per thousand.

The practice of sending men, who a few years ago would have been invalided to England, to one of the hill stations in India has been one of the chief factors in reducing the invaliding rate among European troops. The principal diseases for which invaliding was necessary in 1909 have already been mentioned in the first paragraph of this Section. Of the total number of men invalided, 84 per cent

were under 30 years of age and 74 per cent had been less than five years in India.

Officers.

The average strength of commissioned officers with European troops in India during 1909 was 2,296 and among them there were 1,466 admissions to hospital, 41 were invalided, and 22 died during the year. The admission, constantly sick, death, and invaliding rates were all lower than in 1908, the invaliding rate falling from 42·05 per thousand to 17·86.

The admission rate from enteric fever among the commissioned officers (13·9 per thousand) was the lowest since 1883 and the death rate (·44 per thousand) was the lowest on record. The admission and death rates are represented in actual numbers by 32 and one respectively. Of the 32 officers who suffered from the disease it is known that ten had been inoculated and 16 had not. In the annual reports particulars on this point were not mentioned as regards the remaining eight patients. The 32 cases were spread over no fewer than 20 stations. The officers suffered much less than the rest of the army from malaria. No case of plague occurred, but there were two non-fatal cases of small-pox and one fatal case of cholera. It will be noticed that in Table XVIII* a death of an officer from sleeping sickness is shown. The officer, who was a member of the Royal Army Medical Corps, contracted the disease in East Africa where he had been employed in investigation. He died at Aden on his way to England.

Enteric fever, dysentery, debility, appendicitis, and abscess of the liver were the chief causes of invaliding.

Women.

The average strength of the women during 1909 was 3,913, an increase of 217 on that of the previous year. The statistics of health were unusually favourable, the rates of admission to hospital and of death being 596·7 and 7·67 per thousand respectively as compared with 719·7 and 13·53 in 1908. The constantly sick rate was 24·3 as compared with 30·5. The chief causes of admission to hospital were anæmia and debility, diseases peculiar to women, and malaria, which together accounted for 58·59 per cent of the total number of admissions from all causes.

A comparison of the admission and death rates from enteric fever among the women and men of the European army has already been made in a preceding paragraph. The 40 cases among the women were distributed over 16 stations. There were 12 in Murree, six in Lucknow, four in Ambala and three in Quetta. The outbreak at Murree (in which two officers and fourteen children were also attacked) has already been referred to. There were eight cases of small-pox with one death during the year. It appears from the annual reports that none of those attacked had been revaccinated. Of the total number of deaths (30) seven were due to puerperal affections and abortion, six to enteric fever, three to malaria and three to tubercle of the lungs.

Children.

The admission, constantly sick, and death rates among the children were all much lower than in 1908. The strength was 6,201, the admission rate 384·8 per thousand, the constantly sick rate 14·3 and the death rate 27·41. The chief causes of sickness were respiratory diseases, malaria and diarrhœa

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

which together accounted for 37 per cent of the total admissions. Of the 170 deaths 26 were attributed to diarrhœa, 23 to enteritis, 22 to anæmia, debility and immaturity at birth, 20 to respiratory diseases, 13 to convulsions and 7 to dysentery. There were 36 admissions to hospital with no death from enteric fever, and 282 admissions with four deaths from malaria. Among the exanthemata to which children are liable there came under treatment during the year 156 cases of measles, 54 of chicken-pox, 6 of small-pox and 2 of scarlet fever. There were also 21 cases of whooping-cough, 20 of mumps and 7 of diphtheria.

The strength at different age periods, the death rates per mille and the relative liability to death at each of these periods are shown in Table XXV.* Immaturity at birth was the cause of 16 per cent of the total number of deaths among children under six months of age.

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables of Appendices of the Sanitary Commissioner's Annual Report.

Native Troops.

(For Statistical Tables *see* pages 138 to 141)

India.

The average strength of the Native troops, including those on duty in China and other stations outside India, was 131,627 as compared with 126,975 in 1908. From the statement in the margin it will be seen that their statistics of health were very favourable; indeed all the rates shown in the table were considerably lower than in any year of which there is a record. The rates of mortality noted in the statement do not include the deaths among men on sick leave or furlough at their homes; if those were included the death rate for 1909 would be 6·42 per thousand instead of 5·62. The recorded statistics were, as usual, somewhat more favourable than those of European troops, but except perhaps as regards the death rate it is doubtful if comparison is justifiable; the much lower admission and constantly sick rates among Native troops, for example, are certainly due in part to the greater use of the out-patient system of treatment among those troops as well as to the practice of granting furlough to a large proportion of the Native army during some months of the year and to the practice of sending men suffering from chronic diseases on sick leave to their homes.

Native troops.	All causes. Ratios per mille.		
	1903-07.	1908.	1909.
Admissions	634·5	674·4	584·2
Constantly sick.	23·5	22·8	20·8
Deaths ...	7·96	7·41	5·62
Invalids ...	8·95	6·63	5·74

The lower rate of admission to hospital as compared with 1908 was due almost entirely to a diminished prevalence of malaria, but among the more important diseases the admission rates from dysentery, diarrhœa, cholera and pneumonia were also considerably lower than in that year. On the other hand pyrexia of uncertain origin, respiratory diseases and venereal diseases were more prevalent. The diminished death rate was due chiefly to fewer deaths from cholera, pneumonia and malaria. Plague caused eight deaths as compared with fourteen in 1908 and malaria only 37 as compared with 74.

The chief causes of sickness were malaria, dysentery, pyrexia of uncertain origin, and respiratory diseases, in order of their relative prevalence. Malaria accounted for 31 per cent and dysentery for 5 per cent of the total number of admissions from all causes. The principal causes of death were pneumonia, enteric fever and tubercle of the lungs, these diseases accounting respectively for 33·5 per cent, 7·7 per cent, and 6·9 per cent of the total number of deaths from all causes.

The number of men invalided for discharge from the service was 756 as compared with 842 in 1908, the chief causes of this source of loss being tubercle of the lungs, debility, malaria, and injuries.

If Table XI be compared with Table II it will be seen that according to the statistics the Native troops suffered less than the European troops from venereal diseases, pyrexia of uncertain origin, malaria, hepatic affections, enteric fever, influenza and diarrhœa but that they suffered more from nearly all the other causes of sickness tabulated. As regards some of the diseases mentioned the recorded contrast in prevalence is due chiefly to different methods and ideas concerning diagnosis. An analysis of the statistics and case sheets indicates, for example, that many cases diagnosed as dysentery in the Native arm would, if

they occurred in the European army, be diagnosed as diarrhœa, and that many cases diagnosed as malaria in the Native army would, if they occurred in the European army, be diagnosed as pyrexia of uncertain origin. During recent years the great efforts that have been made in the European army to reduce the prevalence of diseases classified as preventable have been coincident with increased watchfulness that no case shall be returned under the headings of those diseases unless the indications afforded by the signs and symptoms cannot be doubted.

The statistics of Native troops located in stations outside India will be found in Tables XXVIII* and XXIX,* and the following remarks contain some details not given in those Tables. The average strength of the troops serving in Northern and Southern China was 2,361, the rate of admission to hospital was 485·8 per thousand and the death rate was only 2·96 per thousand. The low death rate is probably due chiefly to the fact that patients suffering from serious diseases, such as tuberculosis, are transferred as soon as possible to India. Only one regiment (the 76th Punjabis) was in North China during the year, six companies being stationed at Tientsin and one at Ching-Wan-Tao. Sixteen cases of tuberculosis occurred in the regiment. The disease is very common among the Chinese of the district and the Medical officer considered that among the troops its spread was partly due to overcrowding and defective ventilation in the barracks. There were two regiments in South China (Hong Kong and Kowloon) during the year. Respiratory diseases were the chief cause of admission to hospital. The average strength of the troops in Colombo and Singapore was 1,458, the admission rate was 603 per thousand and the death rate 2·06. The transfer of serious cases to India was the cause of the low death rate. In the stations of the Aden Brigade (Aden, Khormaksar, and Perim) the average strength was 823, the admission rate was 840 per thousand and the death rate 6·08; and the corresponding figures for troops in stations on the Persian Gulf were 276, 623 and 14·49.

Northern and Southern Armies. Divisions.

From Table X it will be found that the sickness and mortality among the Native troops of the Northern Army were much greater than among those of the Southern Army, the admission rate per thousand being higher by 121·6 and the death rate by 1·45. The higher admission rate in the Northern Army was due entirely to the prevalence of malaria and the higher death rate was due chiefly to the mortality from pneumonia and enteric fever. The relative incidence of different diseases in the Native and European troops of the two armies corresponded except in regard to respiratory diseases, pyrexia of uncertain origin, dysentery, diarrhœa, tubercle of the lungs and hepatic affections. As regards the Divisions, the statistics of troops in the 1st (Peshawar) Division were the least favourable during 1909, the 4th (Quetta) Division standing next in the list and the 7th (Meerut) Division third.

Geographical Groups.

For the year under review the geographical areas numbered VII (North-West Frontier) and X (Western coast) must be considered to have been for Native troops more unhealthy than the other areas. Malaria and dysentery were especially prevalent in the first of these groups and malaria, dysentery and respiratory diseases in the second. The highest death rates were recorded in groups XII and VI (Hill Stations and the Upper Sub-Himalaya group), pneumonia being the disease to which the mortality was chiefly due.

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

Stations.

In 1909 there were 41 stations in which the average strength of Native troops was over one thousand. The rates of admission to hospital were very high in five, namely Edwardesabad, Dera Ismail Khan, Nowshera, Jubbulpore and Peshawar, and the death rates were high in Ferozepore, Delhi, Quetta, Peshawar and Bakloh. In Edwardesabad the admission rate was 1,562 per thousand, in Dera Ismail Khan it was 1,479, in Nowshera 1,029, in Jubbulpore 1,011 and in Peshawar 926. In all these stations malaria was the chief cause of the high rate. The highest death rate in any of the larger stations during the year was 14·48 per thousand recorded at Ferozepore the chief cause of the mortality being pneumonia. Abstracts of the cantonment sanitary reports upon 19 of the most unhealthy stations will be found in Table XXX,* so it is unnecessary to refer to them in detail here. Among regiments with a record of much sickness and mortality during the year were the 35th Sikhs at Jhelum, the 46th Punjabis at Ferozepore, the 4th Rajputs at Fort Sandeman, the 1-7th Gurkhas at Quetta and the 20th Infantry at Jhelum. The admission rates in these regiments ranged between 293 and 809 per thousand, and the death rates between 13·53 and 29·01. They will be referred to again in the paragraphs dealing with different diseases.

Cholera.

In the Native army, as in the European, cholera was much less prevalent than in 1908, only 25 cases with 18 deaths being reported as compared with 174 and 116 in that year; and only ten regiments located in nine stations being affected as compared with fifty regiments located in 29 stations. At Almora there were seven cases with four deaths, at Trichinopoly six cases with two deaths and at Belgaum four cases with four deaths. The regiments chiefly affected were the 2-10th Gurkhas, the 75th Carnatic Infantry and the 64th Pioneers. From the annual reports it appears that cholera was unusually prevalent among the general population in the stations where it occurred among the troops, but except this no observation worthy of record was reported by the medical officers of the different regiments. The Sanitary Officer of the Poona Division investigated the outbreak at Belgaum, but the vehicle of infection was not discovered. The cases in the Native regiments at this station occurred on nearly the same dates as the cases in the European regiment.

Small-pox.

There were only 43 admissions to hospital on account of small-pox during 1909 as compared with 103 during 1908, but the number of deaths was eight as compared with three. The cases occurred in 26 regiments located in 20 stations of which Mhow, Kohat, Abbottabad and Kirkee were the only ones at which there were more than two cases. Two of the seven patients at Mhow had had an attack of the disease previously and two had only just joined the regiment and had not been vaccinated.

Malaria.

The practice of treating Native soldiers suffering from malaria as out-patients prevails to so great an extent and varies so much in different years and under the arrangements of different medical officers that the statistics of admissions to hospital on account of the disease are of little or no value as an indication of its true prevalence. There is evidence also that in recent years the adoption of special anti-malarial measures in some cantonments has been followed by a greatly increased use of the out-patient system of treatment, so that in the absence of accurate

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

knowledge regarding the local conditions and practice, comparison with the statistics of former years is not, as a rule, justifiable. The removal of the heading remittent malarial fever from the returns since 1907 has also added to the difficulty of showing what progress is being made in mitigating malaria among Native troops. The rate of admission to hospital on account of malaria in 1909 was 180 per thousand, which represents 23,668 cases and the rate of mortality was ·28 per thousand which represents 37 deaths. In the five years previous to the removal of the heading remittent malarial fever from the returns the mean number of deaths per annum was 123. The months of greatest prevalence of malaria were, as usual, October and November, and the statistics corresponded with those of European troops in so far as there was an unusually large number of admissions during the first few months of the year, thus indicating the prevalence of relapses following upon the severe epidemic that occurred in the autumn of 1908. The statistics showing the relative prevalence of the disease in stations present peculiarities that in some instances are difficult to explain except on the supposition that they were due to one or other of the artificial causes mentioned above. In stations where the average strength was over 150 those with the highest admission rates for the year were Jandola (1,472 per thousand), Dera Ismail Khan (722), Edwardesabad (714), Chakdara (680), Kohima (658), Dibrugarh (536) and Jacobabad (527). In fourteen other stations the admission rate was over 300 per thousand of strength. In Agra the rate rose from 152 per thousand in 1908 to 444 in 1909, in Lucknow from 153 to 322 and in Bannu from 472 to 714. Some considerable falls in the rates were from 430 to 127 in Amritsar, from 702 to 208 in Baroda, from 366 to 46 in Barrackpore, from 331 to 83 in Dinapore and from 438 to 87 in Ferozepore. A non-fatal case of blackwater fever was recorded in the 19th Punjabis at Zam, but particulars regarding it are not available. In regard to measures of prevention nothing of unusual interest was reported by the medical officers of the different regiments.

Pyrexia of uncertain origin.

The heading pyrexia of uncertain origin in the statistics of Native troops includes a wider range of diseases than in those of European troops, and some of the diseases are of a much more serious type. In 1909 there were recorded under the heading 2,925 admissions to hospital and 17 deaths as compared with 2,056 admissions and eleven deaths in 1908. For the army as a whole the incidence of the admissions corresponded with that of malaria and as the negative result of an examination for malaria parasites was the only reason assigned by many medical officers for the return of cases under the heading it is probable that undiagnosed cases of that disease dominated the statistics. On the other hand, the recent differentiation of a disease which in the returns for future years will be designated "sandfly fever" led some medical officers to consider that disease as the chief cause of admissions under the heading, and other medical officers maintained that in their stations the chief disease was distinct from sandfly fever, malaria, influenza, dengue or any other disease hitherto described. The medical officer at Nowshera argued in favour of this view. During October and November he admitted to hospital 163 patients suffering from an acute infectious disease characterized by an attack of fever lasting from three to six days and accompanied usually by vomiting, severe headache, and much pain in the back and limbs. The temperature usually fell gradually, but in many cases on the fifth or sixth day there was a second rise lasting a few hours.

In a few cases (about 8 per cent) a rash appeared towards the end of the attack. He brought forward reasons for considering that the epidemic was not one of influenza or dengue or sandfly fever. In Nowshera sandflies are most prevalent in the early part of the hot season and, although a few could be found during the first half of October, all had disappeared before the end of that month. The epidemic continued until the end of November. Finally, it is apparent from the mortality recorded as due to pyrexia of uncertain origin, that the heading is used for cases of a more serious nature than any of those that are returned under the heading in the records relating to European troops. An examination of the case sheets in which the signs and symptoms of the 17 patients who died were recorded, shows that while a few were cases of short duration with very high fever and early cerebral complications, the majority were cases characterized by long continued irregular fever and an absence of signs or symptoms indicative of any local or general disease commonly known. It is possible, of course, that some of the cases may have been enteric fever and some may have been chronic malaria, but in a number of them every known diagnostic method was tried without a definite conclusion being arrived at. It is particularly unfortunate that in Native regiments permission to perform a *post mortem* examination is almost never obtained.

Kala-azar.

There were eleven cases diagnosed as kala-azar during the year as compared with 9 in 1908. They occurred in the following regiments and stations: five in the 2-2nd Gurkha Rifles and one in the 1-2nd Gurkhas at Dehra Dun, three in the 2-6th Gurkhas and one in the 2-5th Gurkhas at Abbottabad and one in the 124th Baluchistan Infantry at Quetta. Four of the cases were fatal during the year and in three of them the Leishman Donovan parasites were found in smears of splenic tissue made after death.

Relapsing fever.

Nine cases of relapsing fever occurred in the 123rd Rifles at Ahmednagar. It is said that the first patient contracted the disease while on furlough in the Punjab and that the remaining cases occurred among sick attendants or patients in hospital during his illness. The spirillum of the disease was found in the blood of eight of the patients. No case of typhus fever occurred during the year.

Enteric fever.

The removal of the heading remittent fever from the 1906 edition of the Nomenclature of Diseases and from the annual returns since 1907 has made a considerable difference in the statistics of enteric fever among Native troops. From the table in the margin it will be seen that in 1908, which was the first year without remittent fever as one of the headings in the returns, the admissions from enteric fever rose to 350 and the deaths to 73. In 1909 both figures were considerably smaller, but it has been noted already that an unusual number of cases of severe fever were in that year recorded under the heading pyrexia of uncertain origin. The cases diagnosed as enteric fever during 1909 occurred among 106 regiments in 62 stations. Omitting the regiments in which no case occurred there were 46 in which only one case occurred, 24 in which two cases

ENTERIC FEVER. NATIVE TROOPS.

Years.	Total admissions.	Total deaths.
1905 ...	130	35
1906 ...	127	34
1907 ...	182	44
1908 ...	350	73
1909 ...	284	57

occurred, 14 in which three cases occurred and seven in which four cases occurred. Of the remaining 15 regiments those with the largest number of cases were the 94th Russell's Infantry at Baroda in which there were 17, the 1-2nd Gurkha Rifles at Drosh and Dehra Dun in which there were 13, the 2-2nd and 1-8th Gurkha Rifles at Dehra Dun and Shillong respectively, in each of which there were eleven, the 14th Sikhs at Quetta, in which there were ten, the 1-9th Gurkha Rifles at Dehra Dun, in which there were eight, and the 51st Sikhs at Bannu, in which there were seven. The reports by medical officers do not contain much information about the characters of the disease or the probable sources of infection. In most regiments the cases occurred at irregular intervals and were as a rule attributed to casual infection from sources outside the lines. In the 94th Russell's Infantry one or more cases occurred in every month except January, February and October. An attempt was made by the Sanitary Officer of the Mhow Division to ascertain the vehicle of infection. His report states that "after excluding water, milk, and personal infection, it was decided that flies were the most likely cause, and when an examination of some caught in the lines was made in December, *B. typhosus* was found inside them." The outbreak of eight cases in the 14th Sikhs at Quetta was investigated by the Sanitary Officer of that Division. Suspicion fell upon the company cooks and samples of the urine and fæces of those men were examined. An organism which was said to resemble the bacillus typhosus (but which was afterwards proved not to be that bacillus) was isolated from the fæces of one of the cooks and it is said that the outbreak ceased when he had been segregated.

The case-sheets relating to the 57 patients who were said to have died from enteric fever have been examined. They show that in the majority of cases the signs and symptoms and the result of a Widal test supported the diagnosis, but that there was a considerable number in which no adequate reason for the diagnosis was apparent. A *post-mortem* examination was performed in only one of the 57 cases; in that instance the findings confirmed the correctness of the diagnosis.

Malta fever.

From the statement in the margin it will be seen that after a considerable increase in the number of cases of Malta fever among Native troops there has been a fall to thirteen cases in 1909. Of these, seven occurred in Dera Ismail Khan, four in Sialkot, one in Kila Drosh and one in Quetta. The largest number of cases in any regiment was six in the 19th Punjabis at Dera Ismail Khan. It was supposed that the patients had contracted the disease while on leave at their homes. The *Micrococcus melitensis* was cultivated from the blood of two patients.

MALTA FEVER. NATIVE TROOPS.

Years.	Total admissions.	Total deaths.
1902	4	...
1903	8	...
1904	5	1
1905	43	1
1906	38	1
1907	62	2
1908	23	...
1909	13	2

Plague.

Among the general population of India there was an increase of plague in 1909, but the number of cases among Native troops fell from 36 in 1908 to sixteen and the number of deaths from fourteen to eight. Of the cases in 1909 four with two deaths occurred at Ferozepore, the 6th Cavalry and 18th Infantry being the regiments affected. The remaining cases occurred in eight different regiments located in nine stations.

Scurvy.

The total number of admissions to hospital on account of scurvy during 1909 was 182 which gives a ratio of 1·4 per thousand as compared with a ratio of 1·5 per thousand in the previous year. Nearly 60 per cent of the admissions were recorded among troops of the Southern Army. The largest number of cases was among a detachment of the 121st Pioneers at Robat (Quetta Division) where neither milk nor fresh vegetables could be obtained. The medical officer reported that fresh vegetables were sent from Quetta but that the supply was insufficient and that most of the men who had been on duty at Robat suffered from spongy gums and other signs of slight scurvy. Sixteen cases occurred in the 113th Infantry at Aden and 15 cases in the 120th Rajputana Infantry. The medical officer of the 120th Rajputana Infantry noted that cases of scurvy in the regiment were generally coincident with cases of pneumonia and he considered that the oral sepsis accompanying scurvy may be an important predisposing factor in the causation of pneumonia.

Tubercle of the lungs.

The admission rate on account of tubercle of the lungs fell from 3·0 per thousand in 1908 to 2·3 and the death rate from ·42 to ·39 the total number of admissions and deaths being 378 and 53 in 1908 and 308 and 51 in 1909. Among Gurkhas there were 63 cases and 21 deaths as compared with 77 cases and 22 deaths in the previous year the admission and death rates among this class of the Native troops being 4·0 and 1·33 per thousand respectively as compared with 2·1 and ·26 for the rest of the Native army. The recorded death rates are, of course, influenced by invaliding and by granting sick leave or furlough, and the extent to which these measures are resorted to varies in different regiments and years. The largest number of admissions to hospital in any regiment during the year was twelve in the 1-7th Gurkha Rifles at Quetta. The medical officer reported that the buildings occupied by the regiment are good but are too crowded. In the Corps of Guides at Mardan there were nine cases. Two of the patients died in hospital and two while on sick leave at their homes. Four were invalided from the service. The next largest number in any regiment was seven in the 21st Punjabis at Jhelum and in the 27th Punjabis at Multan. In both regiments it was considered that all the cases had been contracted while the patients were on leave at their homes.

Pneumonia.

The admission rate on account of pneumonia was 11·8 per thousand and the death rate 1·88 as compared with rates of 12·8 and 2·20 per thousand respectively in 1908. The disease was less prevalent than in the previous year in seven of the twelve geographical groups and the highest admission rates for the year were recorded in the North-West Frontier group (19·1 per thousand) and the Upper Sub-Himalaya group (16·5). The months of greatest prevalence were, as usual, January, February, March, November and December. Among stations where the average strength was over 100 the highest admission rates were recorded in Kohima (4,500 feet above sea-level) and Dargai (about 4,000 feet). From Table XIII, it will be seen that it is the rule for pneumonia to be more prevalent and fatal in the hill stations between 3,000 and 5,000 feet above sea-level than in the hill stations above the latter height. The great majority of the hill stations below 5,000 feet in height are situated on the North-Western and Western Frontiers of the country.

Dysentery was less prevalent than in 1908 and the number of deaths was only 19 as compared with 28. The disease was most prevalent at Manzai, Santa Cruz, Jandola, Colombo, Barrackpore and Dibrugarh. As regards the prevalence of the disease in regiments most cases occurred in the 109th Infantry at Santa Cruz. The medical officer reports that all the cases were examined by the committee appointed to enquire into dysentery in India and were found to be amœbic in nature. They were resistant to treatment and relapses were common.

Dysentery and diarrhœa.

There were in all 1,006 admissions to hospital and five deaths from diarrhœa as compared with 1,115 and eight in the previous year. The regiments in which most cases occurred were the 4th Rajputs, the 124th Infantry and the 47th Sikhs. The 4th Rajputs were stationed at Fort Sandeman in Baluchistan and supplied detachments for various outposts, among them being Kuchbnia where most of the cases of diarrhœa occurred. The water supply was at first thought to be at fault, but the Sanitary Officer of the Division reported that it was a good potable water possessing no purgative properties. In the other regiments chills and unwholesome food were regarded as the important causes.

Venereal diseases.

The statement in the margin shows the admission rates from venereal diseases among Native and European troops during recent years. It will be seen that the decrease among Native troops has not been nearly so marked as among European troops, and that in 1909 the statistics for those troops were not so favourable as in the three preceding years. The increase as compared with the figures for 1908 was confined to troops of the Northern Army and was most marked among Gurkhas, the admission rate among them rising from 18·2 per thousand to 21·0. Among the troops of the Southern Army the admission rate fell from 20·1 to 18·4. Excluding stations at which the average strength was 100 or less the highest admission rates among Native troops in the Northern Army were recorded at Campbellpore, Bareilly, Almora, Benares, Dehra Dun and Amritsar, and among troops of the Southern Army at Cannanore, Bombay, Belgaum, Port Blair and Poona. Among all the Native troops in India the admission rate for syphilis was 5·0 per thousand, for soft chancre it was 5·1 and for gonorrhœa it was 6·3 as compared respectively with the figures 4·9, 4·3 and 6·0 in 1908.

Years.	Venereal diseases. Admission rates per 1,000.	
	Native Troops.	European Troops.
1903 ...	24·5	247·0
1904 ...	20·6	198·5
1905 ...	19·6	153·7
1906 ...	16·2	117·3
1907 ...	14·7	89·9
1908 ...	15·2	69·6
1909 ...	16·4	67·8

Beri-beri.

There were only three admissions to hospital and there was no death from beri-beri during 1909 among the Native troops. The cases occurred in the 79th Carnatic Infantry at Aurangabad, and the 81st Pioneers and the 2nd Sappers and Miners at Bangalore. No remark upon the cases was made by the medical officers of the regiments.

Suicide.

During the ten years 1899 to 1908 there were altogether 114 cases of suicide in the Native army, an average of about eleven per annum. There were only five in 1909 of which three were by gunshot, one by hanging and one by opium poisoning.

JAILS OF INDIA.

(For Statistical Tables *see* pages 142 to 144.)

India.

In reviewing the health statistics of prisoners for 1908, attention was drawn to the dominant influence of the rainfall on the condition of the Indian people, and it was pointed out that any departure from the normal either in amount or distribution produced most serious effects upon the public health. In 1908 the rainfall in Northern India was excessive in amount and abnormal in distribution, a succession of heavy downpours occurring in a comparatively short time, and the feature of the year was the terrible epidemic of malaria that ravished the northern provinces during the autumn. In 1909 the rainfall, although in some excess in the north-west of the country, was generally well distributed, the crops were nearly everywhere abundant and the public health, as indicated by the diminished death rates, improved greatly. Among the prisoners, however, although the death rates were generally lower than in 1908, they were high compared with recent experience, and it looks as if favourable conditions did not affect the health of the prisoners as it affected the health of the people. It is important to ascertain if possible how far this difference is real and to what it is due. Obviously the subject is a very complex one, largely affected by the presence or absence among the people of epidemic diseases which do not largely affect the prison population, and to some extent by the time taken by the effects of returning prosperity to reach the classes from whom convicts are chiefly recruited, but we may state a few conditions which are occasionally overlooked. During an unhealthy year large numbers of the very young, of the old, and of the sickly die, so that the free population as a whole is robuster at the end of the year than it was at the beginning, and is not likely to suffer a heavy mortality in ordinary conditions; but in the prisons there are no very young persons and many of the sickly are preserved by the care they receive through the unhealthy season to swell the mortality of the following year. In every year a large proportion of the general death rate is contributed by the deaths of infants, in the year following an unhealthy season the number of children born is greatly diminished, so that the proportion of the death rate due to the deaths of infants is reduced; the general death rate falls accordingly, but the prison death rate does not share in the fall.

The prison population.

The mean daily number of prisoners in India, Burma and the Andamans in 1909 was 112,249, or 3,154 fewer than in the preceding year, the reduction in the total, which was unequally shared by the majority of the administrations, being most conspicuous in the United Provinces and the Andamans. The mean death rate was 25·02 per thousand which is ·55 per thousand higher than in 1908; the rise was due mainly to the great increase in the mortality among the large population in the Andamans, for elsewhere, except in Burma, the Punjab and the North-West Frontier Province, the death rates of 1909 were lower than those of the preceding year.

In India and Burma the mean daily population fell from 101,336 in 1908 to 99,104, and the ratios of admission to hospital and of constantly sick from 646 and 29 to 618 and 28 per thousand, respectively. The admission rates in the several administrations always differ very greatly, and in 1909 the ratios ranged from 1,021 in the North-West Frontier Province and 916 in Bengal to 310 in Burma. The constantly sick ratios, although not differing quite so widely as the admission ratios, also display a wide range from 40 in Bengal to 16 in Burma. The death rate fell from 24·17 in 1908 to 22·85, the rates in the several provinces, ranging from 29·97 in Eastern Bengal to 15·59 in the Central Provinces.

The mean daily number of convicts in the prisons in India and Burma was 93,058, and they died at the rate of 22·97 per thousand. Among the appendices* there will be found two statements, F and G, in which the statistics for five years of the sickness and mortality among convicts in the central and district jails of the several administrations are analysed. The distribution of convicts among central and district jails in 1909 was, as usual, almost equal, but while there was more sickness among the prisoners in district jails, prisoners in central jails died at a greater rate, owing to the excessively high death rates among those prisoners in central jails who had been more than one year and less than seven years in confinement. These high death rates were mainly due to tubercle of the lungs to which more than one-fifth of the total mortality in central jails was due, the proportion rising to between one-fourth and one-third among convicts who had been more than two and less than seven years in prison.

Causes of sickness and mortality.

The diseases to which were due the greatest amount of sickness were malaria (admission rate 172·4 per thousand), dysentery (70·2), abscess, ulcer and boils (66·1), diarrhœa (38·6) and respiratory diseases (23·3); while the principal causes of death were dysentery (death rate 4·20 per thousand), tubercle of the lungs (3·72) and pneumonia (3·60).

Malaria.

The number of cases of malaria admitted into hospital was 17,082, about 3,000 less than in 1908; and there were 118 deaths attributed to this cause. In considering the statistics of malaria among Indian prisoners, allowance must be made for two tendencies, one of which reduces the apparent amount of sickness from malaria while the other augments the malaria death rate. The admission rate is reduced by the practice of medically treating cases of malaria while they are under observation without admitting them to hospital; the death rate is augmented by ascribing to malaria deaths which are due to other causes. It is impossible to say how far the former practice prevails; but errors in the diagnosis of malaria must be very common, for the *post mortem* records show that in some provinces as many as 25 per cent of the deaths recorded as due to malaria were due to some other cause. Such errors are made in serious cases ending fatally in which the records are fairly complete so that it may reasonably be suspected that errors in slighter cases are not less common. This of course has an important bearing on the results of prophylaxis, because the destruction of anopheles and the administration of quinine cannot be expected to reduce the frequency of diseases other than malaria. The use made of the heading pyrexia of uncertain origin seems to vary in the different provinces. The term

* When a table or appendix is marked with an asterisk it refers to the standard tables or appendices of the Sanitary Commissioner's Annual Report.

suggests malaria, and doubtless a large proportion of the cases to which it is applied have a malarial origin, but the disparity between the ratios of admission on account of malaria and of pyrexia of uncertain origin in the several provinces shows either that there is great divergence in diagnostic practice or that unidentified fevers are peculiarly prevalent in certain provinces. Among the whole prison population, excluding convicts at the Andamans, the proportion of cases of pyrexia of uncertain origin to cases of malaria was about 2 to 34, but in Burma the proportion was 2 to 3, and in Madras 2 to 5.

The admission rate for malaria in India and Burma was 172·4 per thousand, compared with 197·7 in 1908, the fall being common, although in widely differing degree, to all provinces except Bengal and Madras. As usual the frequency of malarial attacks varied enormously in the several provinces. By far the highest admission rate was recorded in the North-West Frontier Province, 504·4 per thousand. The other provinces may be arranged in three groups—Bengal, Eastern Bengal and Assam and the United Provinces, with rates ranging from 273·8 to 212·1 per thousand; the Central Provinces, the Punjab and Bombay with a range from 151·3 to 123·8, and Madras and Burma with rates of 81·0 and 35·5 per thousand, respectively. In Madras the admission rate for pyrexia of uncertain origin was 32·5 and in Burma it was 22·8.

The mortality ascribed to malaria does not correspond with the frequency of the disease among the whole prison population,* for in spite of the decline in the admission rate in 1909 the death rate rose from 1·04 to 1·19. In two provinces, Eastern Bengal and Assam (2·79) and Bengal (2·06), the rates were over 2 per thousand, and in three Madras (·83), Burma (·29) and the Punjab (·26) they were much below 1 per thousand. The case mortality presents interesting variations; in Eastern Bengal and Assam (1·12), Bombay and Madras it was slightly over 1 per cent; in Burma, the Central Provinces and Bengal it was between ·82 and ·75, while in the three provinces where the incidence of the disease is most distinctly seasonal, that is to say where there is a comparatively large increase in the frequency of attacks during the autumn months, the case mortality was lowest, the United Provinces (·58 per cent), the North-West Frontier Province (·29) and the Punjab (·19). In all provinces there is a continuous flow into the hospitals of cases of malaria, and the proportion of admissions each month is generally fairly constant from year to year. The distribution of cases in 1909 was, however, peculiar and in marked contrast to the distribution in the preceding year, when the distribution of malaria cases was typical, but exaggerated. In the first half of 1908 the number of cases was below the average; in the same period in 1909 the figure was slightly above the average. In July 1908 the numbers were low, while in July 1909 the numbers were extraordinarily large. The autumn of 1908 was characterised by an epidemic of exceptional severity, the figures being extraordinarily high in September and October; in 1909 the number of admissions in the autumn were very low, particularly in September and October.

Prophylaxis.

Measures directed against mosquitoes such as the cutting of undergrowth, draining or oiling pools, seem to be in general use, although Inspectors-General do not give much information on this subject. In this connection attention

* The Andaman convict population is excluded from this comparison because only a small proportion of the convicts live in ordinary prison conditions. The figures among the Andaman convicts in 1909 were—admission rate 1075·4 and death rate 4·56 per thousand, case mortality ·42 per cent.

may be drawn to a striking article by Dr. Kreyenberg who protests against the indiscriminate use of petroleum for the destruction of larvæ. Dr. Kreyenberg points out that in permanent ponds and tanks the balance of nature is soon established so that fish and other creatures speedily destroy any mosquito larvæ that may develop in them, and that it is in temporary pools, caused by rain or by the overflowing of streams, and in drains that mosquitoes breed. Temporary collections of water should be abolished or oiled, but permanent ponds should not be oiled, but if necessary be stocked with the fauna and flora of other ponds in the neighbourhood. Possibly Dr. Kreyenberg is too optimistic, but experiments with fish as larvæ destroyers have been fairly successful in this country where there are many suitable kinds available. 'Millions' (*Girardinus pæciloides*) have been introduced from Barbadoes and they have relatives in India with a similar appetite for larvæ. Dr. Bentley has recently found that a fish known locally as *kazara* and identified as *Anabas scandens* is very destructive to larvæ in Bombay.

Quinine prophylaxis was in general use and with very few exceptions medical superintendents believe firmly in its efficacy, although there is much difference of opinion regarding the most efficacious dosage. It is to be regretted that quinine prophylaxis in prisons is so largely empirical; the preventive administration of quinine ought to be accompanied by the systematic use of the microscope for the examination of blood, when we should soon learn, not only the most effective methods of giving quinine, but the relation of quinine administration to the presence of parasites in the blood, and possibly the relation of the presence of parasites in the blood to the occurrence of fever. This relationship is not so simple as it was thought to be, and it has been observed recently in widely separated parts of the world that a large percentage of a community may exhibit parasites in their blood without suffering from fever.

A further series of experiments were carried on during the five months July to November in the jails at Peshawar and Dera Ismail Khan, in the North-West Frontier Province, where malarial fevers are very frequent during the autumn months. In the Peshawar jail three gangs were formed, each consisting of 30 prisoners whose circumstances were as nearly as possible identical. To gang A no quinine was given and 11 cases of malaria occurred among them; to gang B five grains of quinine were given in solution after the morning meal every day, six cases of malaria occurred among them; to gang C 15 grains of quinine were given every 5th and 6th day, and only one case of malaria occurred among them. At Dera Ismail Khan the conditions of the experiment were the same in every particular, except that the gangs consisted of an average number of 47 prisoners and a fourth gang, X, was formed largely from prisoners admitted to jail during the course of the experiment. Among the 47 prisoners of gang A, who got no quinine, 26 cases of malaria occurred; among the prisoners of gang B, who got five grains of quinine daily, 7 cases occurred; among the prisoners of gang C, who got 15 grains of quinine every 5th and 6th day, 2 cases occurred, and in gang X, who also got 15 grains every 5th and 6th day, 16 cases occurred.

At Jubbulpore the experiment was tried of giving nightly a small quantity of kerosine oil to each prisoner to rub into his skin before going to bed. This issue was very popular because the kerosine kept off bugs as well as mosquitoes, but it had soon to be discontinued because some of the prisoners rubbed the kerosine oil into their skin with such misdirected vigour that they succeeded in producing sores, and others put the kerosine into their eyes.

Dysentery was less prevalent among the prisoners generally than in 1908, the admission rate falling from 76·9 to 70·2 per thousand, while the death rate fell from 4·67 to 4·20. In three provinces, however, Madras, Burma and the North-West Frontier Province, the admission rates were higher than in the previous year, and in four, Bombay, the United Provinces, Burma and the North-West Frontier Province, the death rates were higher. The most noticeable feature of the dysentery statistics are the enormously high admission and death rates in Eastern Bengal and Assam and in Bengal, and the comparatively low admission rate and high death rate in Madras. In Northern India the admission and death rates from this cause were abnormally high, a legacy from the unhealthy conditions of 1908, as shown by the relative frequency of cases in the early part of 1909.

Dysentery.

Owing mainly to the greater prevalence of diarrhœa in the prisons of the Punjab and Central Provinces the general admission rate rose from 37·6 per thousand in 1908 to 38·6; while the decrease in the mortality in Eastern Bengal and Assam and the Central Provinces was more than equalized by the increase in the United Provinces and Punjab, so that the general death rate rose from ·94 to 1·04 per thousand.

Diarrhœa.

The ill-effects of the unhealthy conditions of the preceding year are conspicuously manifest in the statistics of tubercle of the lungs. Although the general death rate fell slightly, from 3·76 to 3·72 per thousand, and the admission rate rose only slightly, from 9·4 to 9·9, both the admission and death rates in those northern provinces which suffered from the epidemic of malaria in the autumn of 1908 were abnormally high. In the Punjab, the admission rate rose from 13·0 to 15·4, in the United Provinces it rose from 8·2 to 10·0 and in the North-West Frontier Province it rose from 6·7 to 9·6. In Bengal the high rate of 12·8 rose slightly to 12·9; and in Madras there was a remarkable rise from 7·7 to 10·1, which may possibly be due in part at least to improved diagnosis following on the provision of special accommodation for tubercular disease of the lungs in the jails at Trichinopoly and Bellary. The fall in the admission rate in the Central Provinces from 10·0 to 4·0 is not of much significance in view of the small number of prisoners in the administration. In Eastern Bengal and Assam and in Bombay the admission rates fell from 10·5 and 6·6, respectively, to 8·4 and 3·7 per thousand. By far the highest death rate occurred in the Punjab, where, however, the figure, 5·47, is slightly lower than in 1908. The next highest rates were 4·24 in Bengal and 4·24 in Burma, respectively somewhat lower and somewhat higher than the figures of the preceding year. In the United Provinces and the North-West Frontier Province the tubercular death rate rose considerably and in Madras it rose slightly. In both central and district jails admissions were most numerous in the first part of the year. Inspectors-General are sparing in their remarks regarding the occurrence of tubercle in the jails. One Inspector-General is strongly of opinion that the disease is rapidly increasing in frequency among the people and that its more frequent occurrence among prisoners is the natural consequence; another quotes the opinion of a medical superintendent that tubercle of the lungs is very common among the people in the town in which the jail is situated and that many prisoners are infected when they go into jail; a third

Tubercle of the Lungs.

suspects that the seeming increase of tubercular cases in his prisons is due in a large measure to the more accurate diagnosis rendered possible by the use of the microscope. The statistics do not enable us to say what the real increase among prisoners is, because, leaving changes in nomenclature out of consideration, it is not possible to estimate the effect of improved diagnosis. That improved diagnosis has augmented and will further augment the apparent frequency of tubercle of the lungs among prisoners is evident from an examination of the *post mortem* records which show that, in spite of the attention that has been directed in recent years to this disease, failure to distinguish its presence during life is not uncommon. The statistics certainly show that a very large number of prisoners must be suffering from tubercle when they are convicted, for of the 922 prisoners in whom the disease was diagnosed in 1909, no less than 402 were admitted to hospital within six months of their incarceration. Similar evidence is furnished by the deaths ; there were 354 deaths and of these 77 occurred during the first six months' imprisonment and 126 in the following eighteen months. On the other hand the figures show that a high proportion of cases if they are not contracted, are at any rate developed in jail, and this is particularly noticeable in the statistics of the central jails, in which the admission ratio is highest among prisoners who have been in prison between three and seven years ; while the death ratios rise almost continuously from 2·05 per thousand among prisoners who have been less than six months in prison to 11·70 among those who have been between three and seven years in prison. Some light is thrown upon the question by the records of the state of health at the time of admission to jail of those prisoners who died of tubercle of the lungs. The statistics of central and district jails differ considerably so it will be well to take them separately. In 1909 in the central jails 245 prisoners died from tubercle of the lungs; 120 were in good health on admission, 80 in indifferent health and only 45 in bad health. In district jails the number of prisoners who died from tubercle of the lungs was 109, and of those at the time of their admission 36 were in good health, 30 in indifferent health and 43 in bad health. Almost half the prisoners who died of tubercle of the lungs in central jails and nearly one-third of those who died of the disease in district jails were in good health, as determined by the medical officer of the prison, at the time of their entry into jail. In central jails the mean duration of cases, from the date of admission to hospital until death was 100 days ; in district jails the mean duration was only 58 days.

Pneumonia.

Cases of pneumonia were more common and the mortality was higher than in 1908, the mean admission rate rising from 12·4 to 14·3, and the mean death rate from 3·24 to 3·60 per thousand, respectively. Admission rates were higher than those of the preceding year in all provinces, except Madras, Bombay, Burma and the North-West Frontier Province ; and death rates were higher in all, except Bombay, Burma, the Central Provinces and the North-West Frontier Province. As usual, both admission and death rates varied greatly in the several provinces—the admission rates ranging from 24·4 per thousand in the North-West Frontier Province to 2·2 in Burma, and the death rates from 6·16 in the Punjab to ·66 in Burma. The admission rates in the United Provinces (23·4) and the Punjab (23·9) were exceptionally high.

Anæmia and debility.

The admission rate under this unsatisfactory heading remained at the same figure, 11·8 per thousand, as last year, but the death rate rose slightly

by ·05 to ·60. As in 1908 the highest death rates were registered in Eastern Bengal and Assam (1·12), Bombay (1·05), and Madras (1·20).

Cholera.

There were in all 201 cases of cholera of which 111 terminated fatally. The disease was absent from the jails of only three provinces, Bombay, the Central Provinces and the North-West Frontier Province, but there were only three cases in Bengal.

Small-pox, plague and enteric fever.

Although there were 50 cases of small-pox and two deaths, and only the jails of Burma and the North-West Frontier Province entirely escaped, the numbers of cases were considerable only in Bengal (23), and the United Provinces (13). There were 14 cases of plague, compared with 10 in 1908. The occurrence of enteric fever was recorded in the jails of every administration except Bombay; the total number of cases was 86 of which 21 proved fatal.

Bengal.

In the province of Bengal the rainfall, except in the beginning and end of the year, was considerably in excess of the normal, particularly in Bengal proper and during the monsoon. The winter crops were poor, especially in Bihar, and the prices of food grains remained high until the early advent of the monsoon rainfall, which was on the whole well distributed, dispelled anxiety. Seasonable climatic conditions resulting in abundant water-supplies and comparatively cheap food produced a great improvement on the public health, and the general death rate was lower than it has been for ten years.

The number of prisoners admitted into jail fell from 101,000 to 89,081, but there was a further serious increase in the average daily number in confinement from 15,565 to 16,036. The pressure on the space was greatest in the first seven months of the year and reached the maximum in July, and 23 of the 37 jails were overcrowded throughout the year. The new central jail at Alipore, accommodating 1,390 prisoners, was opened on the 1st December, but the relief thus afforded will not last long, because the old Presidency jail with accommodation for 1,291 prisoners must be evacuated within the next three years. It is proposed to build a new central jail on the most modern lines in which habitual prisoners will be segregated under rigorous discipline.

The rate of admission was 916 per thousand which is a low rate for Bengal, but the constantly sick rate was 40 per thousand, a higher figure than any recently recorded. There were 403 deaths, including 77 among the comparatively small population (1,076) of the Hazaribagh central jail where dysentery was prevalent and fatal. In consequence of the excessive mortality at Hazaribagh the total death rate, 25·13, was higher than the five years' mean, 23·93 per thousand, although it was considerably lower than the high rate, 31·61, recorded in 1908. Cholera was happily almost absent from the jails and only three cases, all of which proved fatal, occurred in three jails. There were 26 cases of enteric fever and nine deaths; 12 cases and five deaths occurring at Hazaribagh where the defective water-supply was suspected owing to the simultaneous occurrence of the disease in the Reformatory School which derives its supply from the same source. Malaria was more prevalent and, according to the reported figures much more deadly than in 1908; the admission rate was 274 compared with 248, and the death rate 2·06 compared with ·84. A death rate of 2·06 per

thousand from malaria among prisoners is so high that it must excite suspicion. There were in all 33 deaths attributed to malaria and in 21 instances an autopsy was held. The details given are often defective in essentials, but certainly the diagnosis was not supported in more than 12 cases. In one jail where 11 deaths were ascribed to malaria details of *post mortem* examinations are given in three cases and in none of them was malaria the apparent cause of death. Quinine prophylaxis is said to be generally used. Tubercle was as frequent as in 1908 but less fatal, the admission rates in the two years, being 12·8 and 12·9 and the death rates 5·01 and 4·24 per thousand, respectively. It is noteworthy that there was no death from tubercle in the Midnapore central jail where the mortality used to be high. The comparative freedom from the disease of this jail is attributed to improvements in its hygienic condition, among them the increased ventilation of the dormitories. A special jail for the segregation of prisoners suffering from tuberculosis has not yet been provided. Pneumonia was somewhat more fatal than usual, the death rate being raised to 2·68 per thousand owing to an epidemic at Midnapore where certain work-sheds appear to have been infected. Dysentery caused an admission rate of 151·5 per thousand and a death rate of 6·42 which, although much lower than the high rate of 8·54 recorded in 1908, is considerably above the quinquennial mean. There was a severe epidemic at Hazaribagh which reached its maximum in July, when no less than 152 cases were admitted to hospital. There were in all 495 cases and 36 deaths. The water-supply of this jail is taken from lakes largely fed by surface drainage and consequently liable to pollution, and in 1909 they were silted up and the pumping apparatus was out of order. At Midnapore although there were 133 cases of dysentery there was only one death from it.

Eastern Bengal and Assam.

The rainfall in the earlier part of the year was in serious defect and the winter crops were very poor so that there was scarcity in some areas. The monsoon rains were, however, abundant and well distributed and the high prices of food grains fell considerably. The general health was poor; small-pox was generally epidemic and the mortality ascribed to fevers was above the normal. The average daily strength of the prison population rose from 7,118 to 7,173, and 12 of the 25 jails were overcrowded. In spite of the poor condition of the public health there was a slight improvement in the condition of the prisoners as compared with 1908, although the constantly sick rate remained at 37 per thousand, the admission rate fell from 917 to 899, and the death rate from 31·89 to 29·97. Among the causes of death the more prominent were dysentery (death rate 8·09 per thousand), pneumonia (4·04), tubercle of the lungs (3·62) and malaria (2·79). The high death rate from malaria indicates faulty diagnosis, and an examination of the notes of the medical histories and autopsies of the 20 fatal cases shows that in at least 12 instances malaria was not the cause of death although in some instances it may have been a complication. As usual the death rate from diseases described as anæmia and debility was comparatively high.

United Provinces.

The rainfall of the year was considerably in excess of the normal, particularly in the west of the province. In April the weather was peculiarly wet and cold. The monsoon burst early and the rain was on the whole well distributed. Owing to the dry autumn of 1908 the *rabi* crops were unsatisfactory, and there was scarcity in some places in the east of the province. The autumn crops were good, and the prices of food

grains, although still high, were considerably less than in 1908. The general death rate in the province was below the mean, but this as an indication of the state of the public health is misleading, because large numbers of weakly and elderly persons died during the malaria epidemic of 1908 and the birth rate of 1909 was unusually low. Moreover, in nine of the districts, the general mortality was higher than in the preceding year. The daily average number of prisoners fell from 28,308 to 26,020, and, except in a few instances, the jails were not overcrowded. The ratio of admissions to hospital fell from 679 to 574 per thousand, and the constantly sick from 31 to 28, but disease was more deadly and the death rate was 23·79 or only ·30 per thousand less than in 1908. Cholera appeared in 5 jails; there were in all 43 cases and 26 deaths. The only serious outbreak was that which occurred in the adjoining central and district jails at Lucknow, between the 4th August and 3rd September. The disease had been prevalent in the city and district and as a warder of the district jail who was employed carrying messages between the jails and the city was the first attacked, it was believed that the infection was brought to the jail by him. In the central jail there were 33 cases and 20 deaths and in the district jail four cases and two deaths. In 1908 the admission rate on account of malaria was 281·3 per thousand; in 1909 it fell to 212·1, and there was a corresponding fall in the death rate from 1·55 to 1·23. The outstanding feature of the malaria incidence in the jails in 1909 was its great prevalence in the first part of the year, and, possibly owing to the wet and cold April, the extraordinarily large number of cases which occurred in May. In normal years in the jails malaria is most common in September, October and November, in 1909 the number of admissions to hospital in these months were, respectively, 503, 512 and 393, compared with 636 in May, 692 in July and 637 in August. A prophylactic issue of 15 grains of quinine was given weekly from the beginning of August until the end of November to every prisoner who would take it, and "practically all the prisoners in the jails took it gladly." All except three of the medical superintendents reported favourably on the effects of the issue, but there was some difference of opinion regarding the best dosage for prophylactic issues. The Inspector-General himself was disappointed with the results in view of the large numbers of cases that occurred in a season that was not particularly malarious. In this connection attention may be drawn to a singular divergence in the monthly incidence of malaria in the jails as indicated by admissions to hospital, and among the general population as indicated by the deaths recorded under the heading fevers. At the beginning of the year malaria was evidently unusually prevalent both outside and inside the jails; but, while the fever mortality in the province generally was as usual comparatively high in the last four months of the year, the numbers of admissions on account of fevers into jail hospitals during those months were comparatively small. Cases of tubercle of the lungs were exceptionally numerous and fatal, this being, in the opinion of the Inspector-General, owing to the effect of famine and malaria—"simply a reflection of the general deterioration in health and increased liability to disease among prisoners admitted to jail". Cases of tubercle of the lungs are isolated in all jails, and the wards for open air treatment in the central prisons have been considerably enlarged. Pneumonia was more frequent and much more fatal than usual, and caused a higher death rate than any other disease. Cases are carefully isolated and the barracks in which they occur are disinfected. More effective arrangements for the disinfection of clothing and bedding are being made by the supply to all jails, as funds permit, of small steam disinfectors. Dysentery, although less prevalent than in 1908, was far more deadly. Among the larger jails the disease was most severe at Lucknow, where many elderly and infirm prisoners suffered from exposure in the cholera camp, and at Bareilly, where

the condition of prisoners received into jail was exceptionally bad. At Saharanpur and Gorakhpur, where prisoners are often found to be suffering from dysentery on admission to jail, there are special hospitals for the treatment of the disease, and in all central and practically all district jails efficient arrangements for the isolation of cases exist; unfortunately in many jails it is not yet possible sufficiently to isolate convalescents.

Punjab.

The medical history of the Punjab jails in 1909 is peculiarly interesting because the bad health of the prisoners furnishes a marked contrast to the apparently satisfactory condition of the general population. Climatic conditions in the province were favourable, the rainfall was approximately normal in quantity and well distributed, both the winter and autumn crops were abundant, prices were low, labour was in great demand, and wages were high. There was but little malaria in the autumn, and the death rate, 30·89 per thousand, was the lowest since 1900. There was a slight increase in the available accommodation in the jails, and the average number of prisoners was considerably below the quinquennial mean; only six jails were temporarily overcrowded, and in only one, the Lahore central jail, was the overcrowding serious. In spite of all these favourable conditions the hospital admission rate rose from 581 per thousand in 1908 to 613 in 1909, and the constantly sick rate from 26 to 28, while the death rate, 25·16 per thousand, was higher than in 1908, and considerably higher than any rate recently recorded in the province. An examination of the conditions in the province shows, I think, that in this instance the low death rate is misleading as an index of the state of the public health and that the wave of prosperity induced by the seasonable rainfall did not immediately reach the lower strata of the population. The death rate was comparatively low in the province generally owing largely to the elimination of the unfit in the disastrous autumn of 1908, to the moderation of the plague epidemic and to the mildness of the autumnal malaria. In several districts, notably Delhi, Karnal, Ferozepore, Shahpur, and those of the Multan Division, death rates remained high, and in most districts the health of the lower classes was very bad in the early part of the year. This is reflected in all the jail returns; the health of the prisoners on admission and in jail was particularly bad during the early months of the year, the death rate, which is ordinarily highest in the second half of the year, was highest in the first half, and those diseases to which sickly and infirm persons are specially liable were rife—the admission rate on account of tubercle of the lungs rose, dysentery and diarrhœa were very prevalent, and pneumonia was not only very common, but exceedingly fatal, causing a death rate of 6·16 per thousand. Malaria was comparatively prevalent in the early part of the year, and the largest number of attacks occurred in May; in the jails as in the province generally the autumnal malaria was mild. Only three deaths were attributed to malaria two of which occurred at Gurdaspur where there were only 24 cases of the disease admitted to hospital. Quinine was given prophylactically during the four autumn months when there were 424 admissions to hospital on account of malaria about one-fourth of the year's total of 1,606. The number of admissions on account of tubercle of the lungs rose from 155 in 1908 to 177 and the number of deaths was 63. A special ward for the outdoor treatment of tuberculous cases was added to the Montgomery jail during the year. There were 448 admissions to hospital for dysentery, a smaller number than in 1908, but much above the quinquennial mean. In most jails 'post dysenteric' gangs have been formed in order to diminish the

danger of the transmission of the disease by convalescents. There were 276 cases of pneumonia, which was specially prevalent in the jails at Lahore, Karnal, Hissar, Ferozepore and Jhelum.

North-West Frontier Province.

The rainfall, which was in defect during the first half of the year, was ample and well distributed during the season of the monsoon, and average, or more than average crops on a considerably extended area of cultivation lowered the prices of food grains and raised the rate of wages. The birth rate, owing to the malarious autumn of 1908, was lower than usual; the death rate was more than 6 per thousand below the quinquennial mean.

There was a trifling increase in the daily average strength of prisoners which was 1,354, and in the Peshawar jail for the greater part of the year there was fairly constant, but apparently unavoidable, overcrowding, the evil effects of which were minimised by the use of tents.

The good health of the general population was mirrored in the jail statistics, the ratio of admission falling from 1,222 to 1,021, and the rate of constantly sick from 37 to 27 per thousand. The death rate, however, rose from 15·61 to 20·68 per thousand, the higher mortality being in part due to the greater prevalence and fatality of tubercle of the lungs and dysentery. Of the 28 deaths two were due to heat-stroke and six to typhus fever, of which there was an outbreak in the Peshawar jail lasting from the 1st February until the end of May. The origin of the disease could not be traced, and although every precaution was taken to limit its spread, "including the measure formerly so successful of destroying the bed-bugs that could be found in cots, cubicles, etc.", the infection was not stayed and 22 cases in all occurred. The number of cases of malaria fell from 905 in 1908 to 683, but there were two deaths, both in the Peshawar jail.

Central Provinces.

During the hot weather months and autumn the rainfall was in excess; during January and February and in the monsoon period, June to September, it was in considerable defect, but as the rain was generally well distributed and seasonable, the crops were good and food supplies were ample. The provincial birth rate was lower than the mean of recent years, and the death rate, 33·09 per thousand, was the lowest since 1905; in a few districts, however, the death rates were swollen owing to the presence of cholera and plague. The average daily number of prisoners in the jails rose from 4,013 to 4,297, a total far below the number for which accommodation is provided. The prisoners shared in the good health of the general population; the admission rate fell from 632 in 1908 to 514, the constantly sick rate from 21 to 18, and the death rate from 22·18 to 15·59 per thousand, respectively. There was a notable decline in the mortality from tubercle of the lungs from 3·99 per thousand to 1·63; and the mortality from dysentery fell from 5·23 to 3·72. The number of malaria cases fell from 961 to 650 and there were five deaths. The seasonal distribution differed from the ordinary in the small number of cases that occurred in October. The number of cases of dysentery fell from 181 to 127. The Inspector-General is of opinion that much of the dysentery that occurs in the Central Provinces jails is due to the "unaccustomed plenty" of the diet provided. The seasonal incidence of the disease in the jails is, however, much the same from year to year, and does not differ from the seasonal

incidence among the general population as indicated by the deaths from bowel complaints among them, the greatest prevalence of the disease occurring in July, August and September. Pneumonia and diarrhœa were both rather more common than in 1908, but the cases were apparently milder. An innovation was introduced into the Jubbulpore jail by the opening of a dispensary in the part of the jail occupied by habituals for the treatment of slight cases under observation. This has had a satisfactory effect in reducing the number of minor ailments reported, and a similar dispensary was opened in the Nagpur jail.

Madras.

In consequence of the failure of the north-east monsoon rains in 1908 the high prices of food grains were maintained in 1909, and although the south-west monsoon rainfall was ample and the crops abundant prices did not fall. The north-east monsoon in 1909 failed entirely. The general health in the presidency was good, the birth rate was the highest on record, and owing to cholera and fevers being less prevalent than usual, the death rate was considerably less than the quinquennial mean. The number of prisoners who passed through the jails was smaller than in 1908, but owing to sentences being generally more severe, the average daily number in confinement rose from 10,638 to the record number 10,815. As this number is in excess of the accommodation available, some overcrowding was inevitable, but it was nowhere very serious and arrangements were made to mitigate the evil. Although the death rate fell from 29·80 per thousand in 1908 to 25·24, the general health of the prisoners in most of the jails, particularly in the earlier months of the year, was far from good, and the ratios of admissions to hospital and of constantly sick rose from 443 to 497, and from 23 to 25 per thousand, respectively. The increase in these figures is stated by the Inspector-General to be due rather to attention to injunctions regarding the prompt admission to hospital of all cases of illness likely to require hospital treatment, than to the generally poor condition of the prisoners, but regarding many of the jails in which the death rates were exceptionally high it is explained that prisoners were in a bad state of health on admission to jail, and it was just those diseases which we expect to find among a weakened population that were especially prevalent and fatal—the number of cases of tubercle of the lungs rose from 89 in 1908 to 109 and the death rate from 3·20 to 3·88; cases of pneumonia were almost as frequent as in 1908, the incidence of the disease being much above the average in each of the first four months of the year, and the death rate rose slightly, while cases labelled anæmia and debility increased in number from 217 to 224, and the death rate from ·94 to 1·20. Dysentery was unusually prevalent in the earlier part of the year and in June and July. Cases of malaria were rather more numerous than usual, although the death rate, ·83 per thousand, was well below the quinquennial mean. Even this figure is much above the real malaria death rate, for the records of the autopsies show that of the nine deaths attributed to malaria six were due to dysentery. Cholera appeared in three jails, Coimbatore, Berhampur and Madura, and caused a death rate of 3·51 per thousand. At Madura there was a single fatal case, but the outbreaks at Coimbatore and Berhampur were serious. At Coimbatore there were 50 cases and 20 deaths during 30 days. The origin of the disease could not be traced; there was no cholera in the town or *taluka* prior to the occurrence of the disease in the jail; the water-supply was reported free from infection, and the prisoners were not moved into camp. At Berhampur there were 39 cases and 17 deaths. Cholera was prevalent in the city, *taluka* and district at the time of the outbreak in the jail.

Bombay.

The rainfall, which was generally in defect in the early part of the year, was in slight excess during the monsoon, except in the Deccan. The cold weather crops although sown over a larger area than usual yielded a poor return, but the *kharif*, except in the east of the Karnatak and of the Deccan, was good, and prices were normal except in Bijapur, Kanara and Panch Mahals, where, early in the year, there was some scarcity. The death rate was 27·38 per thousand, considerably below the quinquennial mean, the reduction being due mainly to the comparative absence of plague, but also to a decline in the mortality from fevers, bowel complaints and respiratory diseases. The daily average number of prisoners in confinement fell from 7,930 in 1908 to 7,591, and their health was generally good. The ratio of admissions to hospital fell from 654 per thousand to 580, and the constantly sick rate from 33 to 28, while the reduction in the death rate from 18·16 to 17·92 would have been greater, but for the comparatively large number of deaths which may fairly be described as 'accidental'. The number of cases of tubercle admitted to hospital fell from 52 to 28, and the death rate from 3·03 to 1·98. Six of the cases of tubercle and four of the deaths occurred among the small population of the Common Prison in Bombay, where the high general death rate 42·39 per thousand, is ascribed by the Inspector-General to the facts that "the Bombay habitual is a syphilitic, malaria-sodden debauched person," and that every healthy prisoner is sent from the Common Prison to the Deccan gang. The number of cases of pneumonia fell from 136 to 99, and the death rate from 3·28 to 3·16. Cases of pneumonia were as usual common in January and February, but the numbers of cases occurring in the last three months of the year were much below the average. Dysentery was far less prevalent than usual, but the death rate, 1·98 per thousand, was rather above than below the average. Four of the deaths from dysentery occurred in the central prison at Hyderabad, where the cooking, "now an object of special care", was unsatisfactory. The number of admissions to hospital on account of malaria was nearly as large as in the preceding year, 940 compared with 997, and the death rate was slightly higher, 1·32 compared with 1·26. It is explained that in nearly every instance the prisoners that died were suffering severely from the effect of malarial infection when admitted into jail. In a considerable proportion of the fatal cases, however, although malaria may have been a complication it was not the cause of death. Quinine was issued as a prophylactic in most jails, and orders have been issued to, 'ensure greater uniformity of practice in dosage, etc.' There was another outbreak of cerebro-spinal meningitis, 17 cases and five deaths, at Hyderabad.

Burma.

The rainfall in the early part of the year was irregularly distributed and the last three months were distinguished by an unusually heavy rainfall, but the monsoon rains were abundant and timely, and the crops were excellent throughout the year, the prices of the staple grain in all parts of the country being much lower than in 1908. The general health as indicated by the mortality was not particularly good; in Lower Burma the death rate was considerably above the mean, possibly owing to improved registration, and in Upper Burma cholera was prevalent, while the death rates from fevers and bowel complaints were higher than usual.

The average daily number of prisoners in the jails was 13,680, a somewhat smaller figure than any recorded in recent years. The general health of

the prisoners was good although the statistics were not so favourable as those of recent years. The ratio of admission to hospital was 310 per thousand, compared with 277 in 1908 and 256 in 1907, and the constantly sick rate was 16, compared with 16 in 1908 and 14 in 1907. The death rate was 16·15, compared with 13·27 and 11·88 in the two preceding years. The increase in the death rate was largely due to an outbreak of cholera in the Mandalay jail. The disease appeared in July and there were 37 cases and 28 deaths. There was a small outbreak in the Insein jail, 6 cases and 3 deaths, and single cases in Pagan (fatal), Bassein and Moulmein. Cases of malaria are becoming progressively less frequent in the jails of Burma, and in 1909 the number fell to 486, the death rate being ·29 per thousand. Quinine is administered in ten grain doses twice weekly to malarial subjects, apparently with beneficial effect, and other anti-malarial measures are carried out as far as possible. The number of admissions to hospital on account of tubercle of the lungs rose from 106 in 1908 to 110, and the death rate from 3·39 to 4·24 per thousand. Cases of tubercle are of rare occurrence in the jails of Upper Burma, most of the few cases shown in the returns having been transferred from the lower province. During 1909 six cases were sent to Myingyan and seven to Yamethin. A proposal to build an addition to the Yamethin jail for the accommodation of tubercular prisoners from all parts of the province is being considered. There was a slight increase, from 269 in 1908 to 280, in the number of cases of dysentery, and the death rate rose from 1·37 to 1·68. The disease was prevalent in the Rangoon central jail, possibly owing to the inexperience of medical subordinates who were frequently changed. There was a notable fall in the number of cases at Myingyan, from 96 in 1908 to 29, attributed to the special attention paid to the preparation of food, the quality of vegetables supplied and to general hygienic measures, including precautions taken against the practice of eating raw *ata*, and the detection and treatment of cases in their early stages. There were only 30 cases of pneumonia and the death rate fell from 1·23 to ·66 per thousand.

Andamans.

The rains began earlier and lasted longer than usual, and the total fall which amounted to 151 inches, was the highest for thirty years. The health of the Settlement was very bad, Europeans and Natives, soldiers, police and convicts, all suffering severely. The average daily number of convicts was further reduced by 922 to 13,145, and there was no overcrowding in the barracks—in many of which structural improvements were effected—or anywhere save in the hospitals. The admission rate rose from 1,439 per thousand in 1908 to 1,761, and the constantly sick rate from 79 to .94, while the death rate, which has been comparatively low since 1906, again rose to the high figure 41·38. The salient feature of the unhealthiness of the year was the great prevalence and severity of malaria from March to September, and of dysentery from May until the end of the year. The ratios of admission from all the more important diseases, except tubercle of the lungs, were much higher than in the previous year, and the death rates from malaria and dysentery were twice as high. Malaria accounted for 14,136 admissions to hospital and 60 deaths, a ratio of 4·56 per thousand. The admission rate would have been higher (and the case mortality lower), but that many convicts had to be treated outside the hospitals which were overcrowded. The Senior Medical Officer describes under malaria, several types of disease—among them (1) a very deadly fever (case mortality 42·5 per

cent) almost confined to the western district and most common among self-supporting convicts, which is characterised by the association of the fever with jaundice, the absence of 'ordinary' malaria parasites and resistance to quinine; and (2) a profound anæmia unaccompanied by fever which is followed by dropsy, parasites being frequently absent from the blood. There were three cases of black-water fever, one of which terminated fatally. Quinine was issued prophylactically in doses of 15 grains once a week from the 2nd May until the 11th October to all labouring convicts. The Senior Medical Officer and his assistants were of opinion that the issue did good, but it is evident that it did not prevent malaria or its sequelæ. This may in part be explained by the fact that while the epidemic of malaria began in March the prophylactic issue was not given until the beginning of May. Under the heading pyrexia of uncertain origin there were 707 admissions to hospital on account of a fever of a peculiar nature in which prolonged periods of pyrexia alternated with shorter periods of absolute freedom from fever. No parasites were found in the blood and Widal tests for Malta fever and enteric fever were negative. The illness lasted in some cases for three or four months, and although distressing, always terminated in recovery. The Senior Medical Officer is of opinion that the epidemic of dysentery was in a measure dependent upon the pre-existing malaria, the convicts and others weakened by malaria being peculiarly susceptible to dysenteric infection, and points out that those convicts who arrived from India after the 22nd August, when the epidemic of malaria was declining, were not attacked by dysentery. The type of dysentery differed from that which ordinarily occurs in the Settlement, œdema and stomatitis were unusually common complications, while the intestinal symptoms were less severe. There were 1,964 admissions and 118 deaths from dysentery, ratios of 149·4 and 8·98 per thousand, respectively. The numbers of cases of and deaths from tubercle of the lungs fell from 148 and 100 in 1908, to 110 and 92, respectively, the ratios on the reduced population of 1909 being 8·4 admitted per thousand compared with 10·5 in the preceding year, and 7 per thousand died, compared with 7·11. The admission rate on account of pneumonia rose from 10·2 per thousand in 1908 to 18·2, and the death rate from 4·12 to 6·24.

The General Population.

(For Statistical Table *see* pages 145 to 148).

Births in British India.

The populations among whom births and deaths were registered in British India in 1909 numbered 226,394,326, and the total number of births recorded during the year was 8,298,379. The birth rate of the year was 36·65 per thousand compared with 37·78 in the preceding year and a quinquennial mean of 38·64. In only five provinces, Bengal, Madras, Coorg, Lower Burma and Upper Burma were the birth rates higher than in 1908, and in only six, Eastern Bengal, Madras, Bombay, Coorg, Ajmer-Merwara and Lower Burma were they higher than the mean birth rate of the previous five years. The most serious decrease in the birth rates occurred in the Punjab, the United Provinces and Ajmer-Merwara where the people suffered most severely from the epidemic of malaria which occurred in the autumn of 1908. In all provinces, however, except the United Provinces, Coorg and Ajmer-Merwara the birth rates were higher than the death rates, the excess being much higher than elsewhere in the Central Provinces (18·54 per thousand) and Madras (11·3). In the United Provinces the death rate exceeded the birth rate by 4·02 per thousand, and in the small populations in Ajmer-Merwara and Coorg by 13·15 and ·57 per thousand respectively. The mean percentage of male to female births was 106·83; extremely high percentages were, as usual, registered in the North-West Frontier Province (121·4), Sind (130·42) and Ajmer-Merwara (116·52) and a low percentage was registered in Coorg (100·52); elsewhere the percentages ranged from 110 in the Punjab to 104·5 in Madras.

Deaths in British India.

The total number of deaths registered was 6,998,044, compared with 8,653,007 in 1908 and a quinquennial mean of 8,091,841. The death rate was 30·91 per thousand or 7·30 per thousand lower than in 1908 and 4·88 per thousand lower than the mean of the previous five years. The highest death rates were 50·94 in Ajmer-Merwara and 37·34 in the United Provinces, whence the effects of the disastrous autumn of the preceding year had not disappeared, elsewhere the rates ranged from 34·81 in Upper Burma to 26·57 in the North-West Frontier Province and 21·8 in Madras. In all provinces, except Eastern Bengal, Bombay, Upper Burma and Ajmer-Merwara, the death rates in 1909 were lower than in the previous year, and in most provinces the reduction was very large. In Eastern Bengal and Assam, Bengal, and the North-West Frontier Province, the mean death rates in the towns were lower than the mean death rates in the districts, elsewhere, the urban were higher than the rural death rates. In all provinces the numbers of deaths of males were larger than the numbers of deaths of females, and in all provinces, except the Punjab, the North-West Frontier Province, Ajmer-Merwara and Coorg, the death rates of males were higher than the death rates of females.

In India as a whole the highest death rate was recorded in the month of November, when also the highest mortality occurred in Bengal and Eastern Bengal and Assam. The lowest monthly death rate was registered in July,

in which month the lowest mortality occurred in the United Provinces, the Punjab and Ajmer-Merwara. In Madras, the United Provinces, the Punjab and the North-West Frontier Province the highest death rates occurred in January when there was much sickness owing to the malaria epidemic of the preceding autumn.

Cholera occurred in all provinces except Ajmer-Merwara, and death rates from cholera were in excess of 1 per thousand in Upper Burma (2·46), Eastern Bengal and Assam (2·40), Bombay (1·55), Bengal (1·12) and Madras (1·1). Small-pox occurred everywhere, the death rate ranging from ·79 in Eastern Bengal and Assam to ·03 in Ajmer-Merwara and in Coorg. No province was entirely free from plague although only one death was recorded in Eastern Bengal and Assam. The death rate in Ajmer-Merwara was 10·85 per thousand, the only other provinces where it was more than 1 per thousand were the Punjab (1·77), the Central Provinces (1·61), Bombay (1·32) and Upper Burma (1·20). The fever death rates, as usual, varied very greatly. The highest were 33·15 in Ajmer-Merwara and 30·94 in the United Provinces, while the lowest were 9·47 in Upper Burma, 9·44 in Lower Burma and 7·3 in Madras, the three provinces in which the death rates recorded under "all other causes" were highest. Dysentery and diarrhœa were most fatal, according to the registered figures, in the Central Provinces, where the death rate was 2·79 per thousand; the recorded death rates were much lower in the northern provinces than in the southern. Death rates ascribed to respiratory diseases varied largely in the several provinces; they were highest in Bombay (2·89), the Central Provinces (2·60) and the Punjab (2·22), lowest in Bengal (·29) and in Eastern Bengal and Assam (·15).

Calculated on the numbers of children born during the year the mean death rate of male infants was 260·72 and of female infants 226·57 per thousand. In all provinces, with the exception of Ajmer-Merwara, the death rates of male infants were the higher. The highest death rates of male and female infants were recorded in Ajmer-Merwara, elsewhere the rates for male infants ranged from 252·81 per thousand in Upper Burma to 184 in Madras, and for female infants from 240 per thousand in the United Provinces to 162·8 in Madras.

Bengal.

An abundant and generally well distributed rainfall, producing plentiful cheap food and replenishing the supplies of drinking water, had an excellent effect upon the public health, and the death rate of 1909 was nearly 6 per thousand less than the quinquennial mean.

Among the 50,528,446 persons who constituted the census population under registration in Bengal in 1909, there were registered 1,909,547 births, equal to a birth rate of 37·79 per thousand, compared with 36·09 in the previous year and a mean of 38·40 in the previous five years. The increase in the birth rates compared with those of 1908 was general save in the districts of the Patna division, Orissa and Chota Nagpur, where scarcity or unusual sickness or both occurred in 1908. The highest district birth rates were 50·07 per thousand in Champaran, 45·70 in Murshidabad and 45·01 in Monghyr, and, excluding the urban district of Calcutta, 22·90, the lowest rates were 31·88 in Burdwan, 30·69 in the Sonthal Parganas and 30·23 in Singhbhum. In only two towns were the birth rates over 50 per thousand, namely, Sahibganj—a small town in the Sonthal Parganas, 74·75, and Jamalpur 64·14; in both these towns the death rates were

also very high. The lowest urban birth rates were 9·84 in Barasat, 9·05 in Tittaghar and 8·29 in Barunipur, all small towns in the 24-Parganas. The percentage of male to female births ranged from 110 in Calcutta to 102 in Muzaffarpur, Darjeeling, the Sonthal Parganas and Palamau, the provincial mean being 105.

The recorded deaths numbered 1,543,971, and the death rate was 30·55 per thousand compared with 38·56 in 1908 and a mean of 36·39 in the previous five years. Both urban and rural death rates under all the principal headings, except small-pox and respiratory diseases (in towns), were generally lower than in 1908, and excepting Darbhanga, Bhagalpur and Muzaffarpur, all the district death rates were lower than the mean. The highest district rates were 42·15 per thousand in Darbhanga, 42·02 in Patna and 37·95 in Muzaffarpur, while the lowest were 22·52 in Midnapore, 21·40 in the 24-Parganas and 19·41 in Singhbhum. The mean death rate in rural areas was 30·68 per thousand compared with a mean of 28·66 in the towns. The highest urban rates were 65·49 recorded in Sahibganj, 58·70 in Jamalpur and 51·81 in Maniktala. In Sahibganj the death rates from cholera and fever were very high and in Jamalpur also cholera and fever were prevalent. In Maniktala, small-pox was epidemic, cholera was prevalent and the death rate from respiratory diseases was very high. Twenty towns—most of them small however, were free from cholera throughout the year. January was the healthiest month, measured by the death rate, and November the unhealthiest.

Christians died at the rate of 20·76 per thousand; Hindus and Muhammadans at the rates of 31·43 and 28·77, and Buddhists and "other classes" at the rates of 25·68 and 25·28, respectively.

Calculated on the births registered during the year, male infants died at the rate of 188·0 per mille and female infants at the rate of 173·3. Boys and girls between one year and five years of age died at the rates of 45·86 and 41·34 per thousand of the census populations at that age, respectively. In all age periods the male death rates were the higher, the means being 32·01 per thousand among males and 29·11 among females.

Eastern Bengal and Assam.

Among the population under registration which numbered 29,812,735 at the census of 1901, there were recorded in 1909 a total of 1,206,417 births; and the birth rate was 40·46 per thousand, lower by ·68 per thousand than the rate of 1908, but higher by 1·34 per thousand than the quinquennial mean. In discussing the causes of the higher birth rates of the last two years, the provincial Sanitary Commissioner draws attention to the improvement in registration that is taking place, and to the effect on the provincial and district birth rates of favourable health conditions in the year preceding that of a high birth rate. The highest district birth rates were 52·01, 48·22 and 47·33 per thousand recorded, respectively, in Malda, Goalpara and Dinajpur, while the lowest were 34·07 in Pabna, 30·36 in Lakhimpur, and 26·62 in Sibsagar. In rural areas the mean birth rate was 40·76 per thousand, compared with a mean of 26·72 in the towns, in which the rates ranged from 70·47 in Nawabganj and 43·82 in Barpeta, to 5·62 in Mangaldai and 2·10 in Jhalakati. The percentage of male to female births reached the high figure of 115 in Kamrup, in the other districts it varied between 109 in Chittagong and Pabna and 101 in Dinajpur.

The recorded deaths totalled 1,010,355, and the death rate, 33·89 per thousand, was considerably in excess of the five years' mean, 31·77, and the rate of the preceding year, 30·74. The greater part of the excess appears under the heading fevers, but there was a widespread epidemic of small-pox which was particularly prevalent in Rangpur, Bogra and Nowgong. Among the district death rates the highest were 43·29 in Goalpara, 42·90 in Darrang, and 42·08 in Pabna, while the lowest were 26·84 in Tippera and 24·89 in Mymensingh. The mean rural death rate was 34·11 per thousand, compared with 23·70 in the towns, among which the highest rates were 48·48, recorded in Sherpur (Bogra) where cholera and fevers were exceptionally prevalent, 36·46 in Jalpaiguri, and 36·41 in Cox's Bazar. In the small town of North Lakhimpur only three deaths were recorded, equal to a death rate of 2·0 per thousand. The lowest death rates occurred in July, September and October, the highest in November and December.

Muhammadans and Hindus died at the rates of 35·19 and 31·08 per thousand, respectively, and Christians and Buddhists at the rates of 26·28 and 22·13, while among "other classes" the rate was 49·08.

Male and female infants died at the rates of 199·96 and 184·27 per thousand of births registered during the year, respectively, and boys and girls over one year and under five years of age died at the rates of 48·79 and 43·22 per thousand of the census population at that age. At all age periods, save 15—20, 20—30 and 30—40, the death rates of males were higher than the death rates of females, the means being 34·89 and 32·85 among males and females, respectively.

Tea Gardens.

The mean annual strength of the coolies employed on tea gardens in Assam during the year ending the 30th June 1910 increased from 747,812 to 757,076. Of the total labour force 36·68 per cent. were employed in the Surma Valley and 63·32 per cent. in the Assam Valley, against 36·76 and 63·24 per cent in the previous year.

The birth rate for the year was 25·8 per thousand of the total population and 86·1 per thousand of the adult female population, compared with 22·7 and 75·1, respectively, in the previous year. The corresponding provincial ratios for the calendar year 1909 were 40·46 and 189·91 per thousand.

The registered death rate decreased from 34·3 to 28·4, the total number of deaths being 21,476. The provincial registered death rate for the year 1909 was 33·89 per mille.

The principal causes of death were dysentery (4,794), respiratory diseases (3,281), malarial fever (2,491), anæmia or anchylostomiasis (2,424), cholera (1,638) and diarrhœa (1,614). The death rate among coolies from each of the several recruiting areas showed a decrease.

Of a total of 734 gardens, 31 were brought on the unhealthy list as showing a death rate of over 70 per mille among either the Act or Non-Act labourers employed. In the preceding year 63 of the 733 gardens were declared to be unhealthy.

On the journey to the Assam Valley 45 coolies died against 75 in the previous year; 38 of these deaths were due to cholera. No death was reported among coolies travelling to the Surma Valley.

United Provinces.

The births registered in 1909 numbered only 1,589,196 and the birth rate was 33·32 per thousand compared with 37·46 in the preceding year, and 41·35, the quinquennial mean. The fall in the birth rate was due to the malarious autumn of 1908, and the lowest monthly rates were recorded in May (2·23), June (1·60), July (1·59) and August (2·19). In September the rate rose to 3·14 and by December it had reached the maximum, 4·05. Among the districts, Gorakhpur (46·97), Bijnor (42·51) and Shahjahanpur (41·04) had the highest birth rates, and Dehra Dun (25·11), Sitapur (24·66) and Muttra (23·37) the lowest. The mean urban birth rate was 32·80 per thousand, specially high rates being recorded in Shahabad (49·81), Kashipur (47·16) and Bijnor (47·03) and exceptionally low ones in Brindaban, Naini Tal and Mussoorie. The mean percentage of male and female births was 108·70, the percentages ranging from 115·41 in Dehra Dun to 102·92 in Garhwal.

Under favourable climatic conditions and in the comparative absence of epidemics the number of deaths recorded fell from 2,514,761 in 1908 to 1,781,069 and the death rate from 52·37 per thousand to 37·34. Although the death rate was 5·45 per thousand lower than the five years' mean, it was 4·02 higher than the birth rate of the year, deaths being more numerous than births in three-fourths of the districts. The highest district death rate was 49·08 in Shahjahanpur and the lowest 26·63 in Dehra Dun. In rural areas the mean death rate was 37·33, the mean in the towns being 37·56; among the latter the highest rates were 67·63 in Balrampur, where the enormous rate of 58·18 per thousand was registered under fevers, 58·60 in Sahatwar, a small town in Ballia, which suffered severely from cholera and plague, and 55·21 in Mau, a town of 17,700 inhabitants in Azamgarh, in which cholera and plague were prevalent and there were 18 deaths from small-pox. One of the smallest urban death rates was recorded in Allahabad (17·12), in which the death rates under all disease headings were remarkably low.

The lowest death rates were recorded in June and July—the month in which the lowest birth rates were recorded, and the highest, in order, in January, October, November and December.

Christians and "other classes" died at the rates of 8·16 and 10·07 per thousand, respectively, and Muhammadans and Hindus at the rates of 34·37 and 38·02.

The death rates of infants and children in 1909 were not very much more than half of those of the preceding year. Male infants died at the rate of 243·1 and female infants at the rate of 240·0 per thousand born during the year, respectively; and boys and girls between one year and five years of age, died at the rates of 58·37 and 59·04 of the census populations at this age period.

At all age periods except 1—5, 15—20 and 20—30 the death rates of males were higher than the death rates of females, the mean death rates being among males 37·46 per thousand and among females 37·22.

Punjab.

Climatic conidtions were favourable, the prices of food grains were comparatively low, and there was so great a demand for labour in the Canal Colonies that wages were generally high. The ill-effects of the epidemic of malaria are apparent in the low birth rate, only 705,910 births were recorded equal to a rate of 35·1 per thousand, compared with 41·8 in 1908, and a quinquennial mean of 42·4. The highest district birth rate was 68·9 returned in Lyallpur, but in

that district the population has increased greatly since the census, and it is on the census figure that the rate is calculated. In the other districts the rates ranged from 43·5 in Shahpur to 28·0 in Dera Ghazi Khan and 19·4 in Simla. The percentages of male to female births varied between 121·4 in Dera Ghazi Khan and 117·9 in Montgomery and 105 in Kangra, the provincial mean being 110.

The number of deaths recorded totalled 621,083, and the death rate was 30·9 per thousand, nearly 20 per thousand lower than in 1908 and 18·4 per thousand less than the five years' mean. The low death rate was attributable to the great diminution in the prevalence of fever and the comparative freedom of the province from plague, for, although cases were more numerous than in 1908, their number was inconsiderable in comparison with those recorded in the epidemic years of the quinquennium. The district death rates ranged from 39·6 per thousand in Delhi to 23·9 in Jullundur. In rural areas the mean death rate was 30·48 per thousand compared with 34·62 in the towns, in which death rates ranged from 73·32, in a tiny municipality in the Gujranwala district in which cholera and plague occurred to swell the enormous death rate registered under fever, and 56·88 in Multan in which plague was epidemic, to 10·34 in Dharmsala and 4·11 in Khangah Dogran, a small town in Gujranwala. The highest death rates occurred in January, December and November, the lowest in July and August.

Muhammadans died at the rate of 31·75 per thousand, Hindus at the rate of 29·81 and Christians at the rate of 47·62.

Calculated upon the number of children born during the year, the death rate of male infants was 227·5 and of female infants 230·8 per thousand. Boys and girls between one year and five years of age died at the rates of 46·45 and 47·98 per thousand of the census populations, rates which are considerably less than half of those of the preceding year. Except in infancy and after 40 years of age, the death rates of females in the several age periods were higher than those of males, the mean death rates were 30·3 per thousand among males and 31·6 per thousand among females.

North-West Frontier Province.

The number of registered births declined from 71,181 in 1908 to 66,111 and the birth rate from 37·3 to 34·7 per thousand, or 2 per thousand less than the quinquennial mean. The district birth rates varied between 42·0 per thousand in Hazara and 28·7 in Dera Ismail Khan. The percentage of male to female births ranged from 136·5 in Peshawar to 110·2 in Hazara, the provincial mean being 121·4.

The number of deaths recorded was 50,691, nearly 18,000 fewer than in 1908, and the death rate was 26·6 per thousand compared with 35·8 in that year and a quinquennial mean of 32·8. In the districts the rates ranged from 30·2 in Dera Ismail Khan to 24·5 in Hazara. The rural death rate, 26·57 per thousand, was rather higher than the mean death rate in the towns, 25·07. The highest death rate occurred in the first and last quarters, the rates from April to September being very low.

Muhammadans died at the rate of 27·3 per thousand, and Hindus who number about one-fourteenth of the Muhammadan population, at the rate of 19·5.

Calculated on the numbers born, male and female infants died at the rates of 200·3 and 190·9, respectively; and boys and girls between one year and five years

of age at the rates of 34·4 and 33·2 per thousand of the census population. At all age periods save in infancy and childhood, females died at a greater rate than males, the death rate among males and females, respectively, were 26·5 and 26·7 per thousand.

Central Provinces.

The total rainfall was in slight defect, but the rain was well distributed and seasonal, and save in the districts of Wardha, Chanda and Akola, the food supplies were abundant. The year was unusually healthy, and the death rate the lowest since 1905. The registered births totalled 617,987 and the birth rate was 51·63 per thousand compared with 52·84 in 1908 and a quinquennial mean of 53·01. The fall in the birth rate was due to lower rates being recorded in the northern districts in which there was some scarcity in 1908. The highest district birth rate was 59·22 per thousand in Chanda, and the lowest 38·69 in Narsinghpur. The percentage of male to female births ranged from 107·89 in Nagpur to 100·81 in Drug, the provincial mean being 104·77.

Cholera, small-pox, fevers, bowel complaints and plague were all less prevalent than usual and the number of recorded deaths fell from 457,081 in 1908 to 396,135, and the death rate from 38·12 per thousand to 33·09, or 5·58 per thousand less than the five years' mean. In the districts the death rates ranged from 45·06 in Nagpur to 25·11 in Mandla. The mean death rate in rural areas was 32·38 compared with 39·30 in the towns in many of which plague was epidemic. The highest town death rates were 89·78 in Nagpur, including rates of 57·09 from plague and 4·77 from respiratory disease, 68·86 in Barsi Takli, including 36·90 from plague, and 64·19 in Chikhli, including 43·47 from plague. It is noteworthy that in some of the towns in which the death rates from plague were exceptionally high, the fever death rates were exceptionally low; thus, in Nagpur the fever death rate was 4·70, in Barsi Takli it was 3·97 and in Chikhli 3·06.

Muhammadans died at the rate of 36·76 and Hindus at the rate of 29·03 per thousand, respectively. The death rates in the early part of the year were all low, particularly in April, from June onwards the monthly rates began to rise to a maximum in October, when they fell to the end of the year.

Male infants died at the rate of 237·93 and female infants at the rate of 205·19 per thousand born during the year.

Madras.

The number of births registered was 1,215,717 and the birth rate was 33·1 per thousand compared with 32·4 in 1908, and a quinquennial mean of 31·4. The rise in the birth rate which was specially noticeable in Malabar and South Canara is ascribed by the provincial Sanitary Commissioner to an improved state of the public health and more accurate registration. Among the districts, the highest birth rates were 39·2, 38·6 and 38·5, registered in Malabar, Chingleput and Guntur, respectively, and the lowest were 26·3, 26·1 and 26·0 in Nellore, Cuddapah and Vizagapatam. The mean percentage of male to female births was 104·5; the percentages varying in the districts between 107·7 in Madras and 101·9 in Cuddapah.

There were large reductions in the numbers of deaths registered under the headings cholera, fevers and dysentery and diarrhœa, the total number of recorded deaths falling from 960,919 in 1908 to 801,556. The registered death rate was only 21·8 or 4·4 per thousand below the rate of the previous year and

2·6 per thousand below the five years' mean. Excluding the town district of Madras, where the death rate was 38·3 per thousand, the district rates ranged from 29·1 in the Nilgiris to 17·2 in Madura. In rural areas the mean death rate was 21·2 against a mean of 26·4 in the towns.

Muhammadans and Hindus died at the rates of 23·1 and 21·9 per thousand, respectively.

The lowest death rates were registered in April, May and June, the highest in January and December.

Calculated on the numbers born during the year the death rate of male infants was 184·0 per thousand and of female infants 162·8. Boys and girls between one year and five years of age died at the rates of 26·8 and 25·3 per thousand of the census populations. At all age periods except those between 10 and 30 years, the male death rates were the higher, the mean death rates being 22·7 per thousand among males and 21·0 per thousand among females.

Coorg.

The births registered in this small province numbered 4,981 and the birth rate was 27·58 per thousand compared with a five years' mean of 24·28. In the districts the birth rates ranged from 38·43 in Padinalknad *taluk* to 20·22 in Yedinalknad *taluk*, the mean percentage of male to female births being 100·52. Deaths numbered 5,084 and the death rate which averaged 30·44 in the previous five years, fell to 28·15 per thousand, the rates in all districts ranging from 37·31 in Nanjarajpatna *taluk* to 22·69 in Yedinalknad *taluk*. In rural areas the mean death rate was 26·49 compared with 46·17 in the towns, in which the rates were all very high ranging, with the exception of Kodlipet where the death rate was 29·25 per thousand, from 62·10 in Virajendrapet to 40·10 in Mercara. Male and female infants died at the rates of 233·48 and 212·56 per thousand born, respectively. In the age periods between 5 and 30 the death rates of females were higher than those of males, the mean rates being 28·12 per thousand among males and 28·19 among females.

Bombay.

The number of births registered was 657,685 and the birth rate was 35·59 per thousand, very slightly lower than the rate recorded in the previous year 35·72, but 1·44 per thousand higher than the five years' mean. In all districts, except Bombay City, Hyderabad and Larkhana, the recorded birth rates were higher than the death rates, the excess for the whole province being at the rate of 8·21 per thousand. In Bombay proper most of the district birth rates were high, and excluding Bombay City (20·39) ranged from 54·36 in West Khandesh and 48·33 in Broach to 31·44 in Kanara. In all the Sind districts registration is apparently neglected and the birth rates were low, varying between 25·42 in Karachi and 14·65 in Hyderabad. The provincial mean percentage of male and female births was 107·98, the district rates in Bombay proper ranging from 112·79 in Ahmedabad to 102·27 in Dharwar and 102·20 in Bombay City; and in Sind from 142·39 in Hyderabad to 118·59 in Karachi.

The recorded deaths totalled 505,936, and the death rate was 27·38 per thousand compared with 27·15 in 1908, and a quinquennial mean of 33·65. In only two districts were the death rates over 35 per thousand, Ahmedabad 35·68 and Bombay City 35·95. In the remaining districts the rates ranged from 33·95 in Nasik to 14·85 in Upper Sind Frontier. In rural areas the mean

death rate was 25·80 compared with a mean of 34·82 in the towns in which the mean rates recorded under all headings except fever were higher than in the rural areas.

Among the six "sects" into which the population of Bombay * is divided, by far the highest death rate was 51·10 registered for "other classes." Hindus died at the rate of 28·82, Christians and Muhammadans at the rates of 22·24 and 22·09, and Parsis and Jains at the rates of 21·90 and 20·98, respectively.

The highest death rate occurred in April, the lowest in December.

Calculated on the registered births, male infants died at the rate of 187·60 and female infants at the rate of 172·71 per thousand. Boys and girls over one year and under five years of age died at the rates of 47·28 and 46·30 per thousand of the census populations at those ages. Except in the age periods between 5 and 30, males died at higher rates than females, the means being 27·74 and 26·98 per thousand among males and females, respectively.

Lower Burma.

The total number of births registered was 196,179, and the birth rate was 35·27 per thousand, or 1·21 per thousand higher than in 1908 and 2·05 higher than the five years' mean. The increase is no doubt largely due to improving registration, but it is evident that the registration of births in Burma is still very defective. The highest district birth rates were 47·75 recorded in Tavoy, 47·01 in Mergui and 44·15 in Thayetmyo in which the infantile death rates were 110·7, 127·8 and 275·3 per thousand born respectively. The lowest rates, excepting 20·24 in the urban district of Rangoon, were 31·49 in Kyaukpyu, 28·13 in Maubin and 27·46 in Bassein. The mean birth rate in rural areas was 36·59 per thousand compared with 26·18 in the towns. The percentages of male and female births ranged from 109 to 102 in the Arakan districts of Akyab and Sandoway, respectively, the provincial mean being 107.

The deaths registered totalled 154,009 and the death rate fell from 28·06 per thousand in 1908 to 27·70 which is 1·85 per thousand higher than the quinquennial mean. Excluding the urban district of Rangoon in which plague (2·81) and respiratory diseases (6·26) contributed largely to the death rate of 39·63 per thousand, the highest district death rates were 37·62 in Thayetmyo, 34·73 in Pegu and 32·70 in Prome; while the lowest were 21·11 in Akyab and 18·98 in Kyaukpyu. In rural areas the mean death rate was 25·92 per thousand, more than 10 per thousand less than the mean urban rate, 39·97. In most of the towns cholera and plague were more or less prevalent, notably in Pegu, Prome and Gyobingauk where the heaviest mortality occurred.

Hindus died at the rate of 29·19, Muhammadans at the rate of 22·56 and Burmese at the rate of 27·77 per thousand, respectively.

Calculated on the births registered during the year, male infants died at the rate of 234·54 per thousand and females at the rate of 193·21. Boys and girls between the age of one year and five years died at the rate of 29·70 and 27·08 of the census populations. The mean death rate among males was 28·97 and among females 27·04 per thousand, the death rate of males being the higher in all age periods except 30—40.

Upper Burma.

Birth registration has been in force only since 1907 and is stated to be very defective, but the 110,628 births registered calculated on the census population yield a birth rate of 37·10 per thousand, which is ·78 per thousand higher than the rate

recorded in 1908, and 1·83 higher than the birth rate of the older province. In the districts the rates varied from 42·80 in Shwebo to 29·83 in Minbu, the mean percentage of male to female births being 105.

The registered deaths totalled 103,793, and the death rate rose from the five years' mean of 24·42 per thousand and a rate of 28·52 in 1908 to 34·81, the increased mortality being registered under most of the disease headings. Among the districts the death rates ranged from 53·95 in Kyaukse and 49·88 in Mandalay, in both of which cholera was prevalent, to 26·71 in Meiktila. The rural mortality was 33·22 compared with a mean of 47·55 in the towns. The lowest death rate occurred in March, April and May and the highest in July and August.

Among the various classes the highest death rate occurred among the small Hindu population, 46·13 per thousand, the next highest rate was among the Muhammadans, 39·56, followed by 34·70 among the Burmese and 26·0 among Christians.

Calculated upon the number of births registered during the year, male infants died at the rate of 252·81 per thousand and female infants at the rate of 220·63. Boys and girls over one year and under five years of age died at the rates of 44·41 and 41·92 per thousand of the census populations, respectively. At all age periods except 20—30 the death rates of males were higher than the death rates of females, the mean rates for the sexes being 36·94 and 32·88 per thousand among males and females, respectively.

Ajmer-Merwara.

In Ajmer-Merwara the number of births registered was 18,021, and the birth rate was 37·78 per thousand compared with 42·48 in 1908 and 34·69, the five years' mean. In Merwara the birth rate fell from the high rate of 54·13 in 1908 to 47·19 and in Ajmer from 39·02 to 35·0. The percentages of male to female births were 113·42 and 117·79, respectively. The recorded deaths reached the high total of 24,292 and the death rate rose from 32·74 per thousand, the quinquennial mean, and 40·03 in 1908 to 50·94. In Ajmer the death rate was 55·93 and in Merwara it was 34·11. In rural areas the mean rate was 42·95, but in the towns in which plague was epidemic the mean was 72·34—the rate in Ajmer town being 74·68 and in the suburbs 124·28.

The death rate among Muhammadans was 62·90 and among Hindus it was 51·74.

Among infants the recorded death rate of males was considerably lower than that of females, the figures being 253·14 and 263·49 per thousand born, respectively. Boys and girls between the ages of one year and five years died at the high rates of 105·84 and 109·47 per thousand of the census populations, respectively. In all age periods up to 40 years the female death rates were higher than the male death rates, the means of the sexes being 48·45 per thousand among males and 53·70 among females.

History of the Chief Diseases.

(For Statistical Tables *see* pages 149 to 155.)

The accompanying table shows at a glance the number of deaths, and the death rates per thousand of population recorded in British territory in India during each of the five years from 1905 to 1909. On comparing the figures for the year under review with those for the previous year it will be seen that there was a very great decrease in the number of deaths attributed to fevers and to cholera, a considerable decrease in the number attributed to small-pox and dysentery and diarrhœa, and a slight increase in the number attributed to plague. The total deaths recorded in British territory from all causes taken together were fewer by 1,654,963 than in 1908. The chief causes of the unusually low death rates in 1909 have already been mentioned in the preceding section, and here it need only be remarked that as regards cholera we have to go back five years (to 1904), as regards dysentery and diarrhœa 16 years (to 1893) and as regards small-pox four years (to 1905) to find death rates that are lower than those of the year under review. The death rate under the heading "fevers" would also have been unusually low if it had not been that in some provinces the effects of the terrible autumnal epidemic of malaria in 1908 continued to be felt during the early months of 1909.

Years.	Cholera.	Small-pox.	Fevers.	Dysentery and Diarrhœa.	Plague.	All causes.
1905 ...	441,786	70,962	4,417,655	264,124	940,821	8,117,771
	1·96	*·31*	*19·57*	*1·17*	*4·17*	*35·96*
1906 ...	690,519	109,583	4,452,842	298,117	300,355	7,852,330
	3·05	*·48*	*19·69*	*1·32*	*1·33*	*34·73*
1907 ...	408,102	103,988	4,464,881	282,191	1,166,223	8,399,623
	1·81	*·46*	*19·76*	*1·25*	*5·16*	*37·18*
1908 ...	591,725	170,694	5,424,372	285,921	113,888	8,653,007
	2·61	*·75*	*23·96*	*1·26*	*·50*	*38·22*
1909 ...	239,231	101,152	4,487,492	216,956	145,333	6,998,044
	1·05	*·45*	*19·82*	*·96*	*·64*	*30·91*

Cholera in India in 1909.

The number of deaths from cholera recorded in British territory in India during 1909 was 239,231, equal to a death rate of 1·05 per thousand of the total population under registration. The number was considerably less than half the number recorded in 1908, every province except Bombay, Eastern Bengal and Assam and Upper Burma sharing in the decrease. In Bengal, the United Provinces, and the Madras Presidency, where the disease was severely epidemic during 1908, the decline in prevalence was remarkable, the deaths in those three provinces amounting to only about 118,000 as compared with nearly 500,000 in the previous year. The highest death rate from the disease was recorded in Upper Burma (2·46 per thousand), the next highest (2·40) in Eastern Bengal and Assam, and the next (1·55) in the Bombay Presidency. For India as a whole April was the month of greatest prevalence and this applies also to Bengal, Eastern Bengal and Assam, and Bombay. In the United Provinces the disease was chiefly prevalent from June to October, in the Central Provinces from May to September, and in the Madras Presidency from January to March.

Cholera in Bengal.

In Bengal the number of deaths recorded as due to cholera was 56,711 which is the lowest number since 1880. The death rate was only 1·12 per thousand of population as compared with 5·32 in the previous year. No district was entirely free from the disease but in every district except Bhagalpur its prevalence was much less than in 1908. The highest mortality was recorded in the Jessore district where the disease prevailed severely from March to May and again during November and December. The exacerbation at the end of the year was thought to be connected in some way with the pollution of water-supplies during a severe cyclonic storm in October. The towns in which the highest death rates were recorded were Sahibganj in the Sonthal Parganas district (19·97) and Roserha in the Darbhanga district (11·51); in rural areas the highest death rate (9·98 per thousand) was recorded in Lohagara in the Jessore district. The rates compared very favourably with those of 1908.

The treatment of wells with permanganate of potash, was, as usual, carried out in districts and towns where cholera prevailed. In the district of Saran 1,680 wells were treated, in the district of Bhagalpur about 550 and in the districts of Monghyr and Cuttack over 200 in each. It is said that the people generally appreciate the measure.

Cholera in Eastern Bengal and Assam.

The number of deaths attributed to cholera in Eastern Bengal and Assam during 1909 was 71,737, equal to a ratio of 2·40 per thousand of the population, as compared with 59,329 deaths or a ratio of 1·99 in 1908. The curve of monthly deaths showed a double rise, the first during March, April and May, the second during October to December. These epidemic rises indicate for this province the usual seasonal incidence of the disease, which is thought to depend upon the rise and fall of the great rivers. The highest death rates in districts were recorded in Faridpur, Bogra, and Dacca, and the highest in towns were recorded in Sherpur, Pirojpur and Madaripur. No district was entirely free from the disease, but in six of the 54 towns no death from it was reported. Deaths were reported from all except nine of the 242 rural circles, the highest rate (11·99 per thousand) being recorded in the Nalitabari circle of the Mymensingh district.

The death rate from cholera among the tea garden population in Assam was only 2·53 per thousand as compared with 5·34 in 1908, the lower mortality being attributed chiefly to a great decrease in the number of immigrant coolies.

Cholera in the United Provinces.

The number of deaths recorded from cholera in the United Provinces was only 21,823 as compared with 83,544 in 1908, the death rates in the two years being respectively ·46 and 1·75. During January and February 33 of the 48 districts were entirely free from the disease but in March deaths were reported from 22 districts, in April from 36, and in June from 43. The disease remained widespread until the end of October, but except in a few districts its prevalence was not very great. The highest death rate recorded in districts was 4·04 per thousand in Garhwal and the next highest 3·06 in Almora. It is said that the disease was imported into these and other hill districts by pilgrims returning from the Adhkumbh fair at Hardwar. Among the 105 towns with a population of 10,000 and upwards there were 39 in which no death from

cholera was reported and there were 32 in which the number of deaths did not exceed ten. The highest death rate in any town was 18·73 per thousand in Sahatwar and the next highest 9·38 in Bansdih. Both these towns are in the Ballia district. The urban mortality was at the rate of ·64 per thousand as compared with the rural mortality rate of ·44 per thousand.

Cholera in the Punjab.

In the Punjab the total number of deaths recorded as due to cholera was only 1,513 (·08 per thousand of population) as compared with 12,297 (·61) in 1908. The disease was, as usual, confined almost entirely to the months from April to September, being chiefly prevalent during May and June. Its origin in April was attributed to importation by pilgrims returning from Hardwar and the history of the earliest cases that occurred in a number of districts supports that view. The area affected by the disease was small, deaths being reported from only 183 among the 32,834 towns and villages in the province. The highest death rate in any district was only ·67 per thousand in Karnal and the next highest ·29 in Hissar. The largest number of deaths recorded in any town was 58 in Amritsar.

Cholera in the North-West Frontier Province.

In the North-West Frontier Province only 134 deaths from cholera were recorded during 1909 as compared with 2,845 in 1908. The disease prevailed almost exclusively in the Dera Ismail Khan district during July and August.

Cholera in the Central Provinces.

In the Central Provinces and Berar 7,687 deaths were attributed to cholera as compared with 9,048 in the previous year. On the census population of 1901 the ratios work out to ·64 and ·76 per thousand, respectively. The disease prevailed chiefly from May until the end of September, August being the month in which most deaths were reported. No death from the disease was recorded in five of the 24 districts. The highest death rate in districts was 2·04 per thousand in Buldana and the next highest 1·78 in Akola. It is said that the district of Buldana became infected by pilgrims from Nasik and Benares. The largest numbers of deaths in towns were 99 in Arang in the Raipur district, 70 in Kamptee in the Nagpur district, and 67 in Malkapur in the Buldana district. The chief measures adopted in infected places were the treatment of sources of water-supply with permanganate of potash and the distribution of medicines by the vaccination staff and the police.

Cholera in the Madras Presidency.

In the Madras Presidency in 1909 there were 39,424 deaths recorded as due to cholera, giving a ratio of 1·1 per thousand of the population as compared with a total of 141,970 and a ratio of 3·9 in 1908. In this Presidency cholera is, as a rule, most prevalent during the monsoons from June to December, but in 1909 the rainfall was unusually heavy from January to March and these were also the months in which cholera was most prevalent. From April until the end of the year the number of deaths recorded each month varied only very slightly. The districts with the highest death rates from the disease were Trichinopoly, Salem and Coimbatore, but 2·6 per thousand of population was the highest rate in any district. The highest death rates in towns were 17·2 per thousand in Palni and 11·6 in Rameswaram both in the Madura district. It is stated that in places where the inhabitants obtain their drinking water from wells the

use of permanganate of potash has been found to be an efficacious method of preventing cholera.

Cholera in the Bombay Presidency.

In the Bombay Presidency there were recorded as due to cholera 28,714 deaths, equal to a ratio of 1·55 per thousand of the population, as compared with only 1,759 deaths or a ratio of ·09 in 1908. The disease was most prevalent from April until the end of August, nearly 90 per cent of all the deaths occurring during those months. The widespread character of the epidemic is shown by the fact that deaths from the disease were recorded in 218 of the 270 registration circles in the collectorates affected. The highest death rates in districts were 5·20 per thousand in Belgaum, 3·22 in Bijapur and 2·78 in Nasik, and in towns the highest rates were 24·15 per thousand in Nasik and 12·02 in Hubli. It was the general opinion that the spread of the disease was largely aided by the movement of the people in connection with religious fairs and particularly in connection with the great Sinhast fair at Nasik, which lasted from July 1908 until August 1909. It is said that steps have been taken to improve the sanitary conditions at this religious festival so that in future it may not prove so great a source of infection. The danger of "step wells" which are very common in villages on the roads frequented by pilgrims is an important matter to which attention is directed in the reports of several Deputy Sanitary Commissioners and the recommendation is made that all such should be converted into "draw wells." The results of a series of experiments carried out by the Deputy Sanitary Commissioner of the Southern Registration District during the year tended to show that permanganate of potash when used according to the instructions prescribed for village officers will effectively purify a well that has been contaminated with the cholera vibrio.

Cholera in Burma.

In Lower Burma during 1909 there were recorded as due to cholera 4,041 deaths, as compared with 9,336 deaths in the previous year, and in Upper Burma 7,348 deaths were recorded as compared with 2,575. In Lower Burma the districts of the Irrawaddy division were chiefly affected, April and May being the months of greatest prevalence. In Upper Burma every district was affected and July and August were the months of chief prevalence. The highest death rates in districts were 7·22 per thousand in Kyaukse and 3·82 in Mandalay both in Upper Burma and the highest in towns 10·68 in Pyapon, 10·28 in Kyaiklat, and 9·34 in Wakema all in the Irrawaddy division of Lower Burma. With regard to the prevention of the disease the provincial Sanitary Commissioner notes that wherever possible wells have been permanganated and that in certain places something has been done by the repair of surface wells and the use of tube wells to limit the risks caused by the careless habits of the people.

Cholera in Ajmer-Merwara and Coorg.

No death from cholera was recorded in Ajmer-Merwara during 1909, but in Coorg 99 deaths from the disease were reported, the ratio per thousand of the population being ·55 as compared with ·63 in 1908.

Small-pox.

From the marginal statement in the first paragraph of this section it will be seen that in British territory in India the death rate from small-pox fell from ·75 per thousand of population in 1908 to ·45 in 1909. The latter was also the mean ratio for the

quinquennial period from 1904 to 1908. The total number of deaths was 101,152 against 170,694 in 1908 and 103,988 in 1907. The death rates were lower than in 1908 in all provinces except Bengal, Eastern Bengal and Assam, and the Bombay Presidency, the decrease, as regards the chief provinces, being greatest in the Punjab. The death rate in towns was ·63 per thousand as compared with ·43 in rural areas. The deaths of children amounted to 53·15 per cent of the total number of deaths from this cause.

In Bengal the mortality from small-pox has increased each year since 1906, and in 1909 it rose to 38,609 (·76 per thousand) as compared with 35,966 (·71) in 1908. Excluding the mortality in towns, the highest death rate in any district was 2·53 per thousand in Howrah, but if the mortality in towns is included the district of Calcutta, with a rate of 4·46, stands first and Howrah, with a rate of 3·40 stands next. In Calcutta the disease broke out in epidemic form during the last week of December 1908 and the epidemic prevailed with severity until the end of May 1909. In the province as a whole, April was the month of greatest prevalence. The mortality among infants and children was considerably less than in the previous year.

In Eastern Bengal and Assam the deaths of 23,604 persons were attributed to small-pox during 1909, as compared with only 9,373 during 1908, the ratios per thousand of the population for the two years being ·79 and ·31, respectively. It is said that the increased prevalence was due to the constant importation of cases from Calcutta. The districts chiefly affected were Rangpur, Bogra, Nowgong, Darrang and Dinajpur. The provincial Sanitary Commissioner notes that Rangpur, Bogra and Dinajpur are the worst vaccinated districts in the province. The disease chiefly prevailed, as usual, from February to August, and April and May were the months in which there were most deaths from it. Deaths were reported from 37 of the 54 towns. Considerable opposition to vaccination still exists even in some of the towns.

In the United Provinces there were only 5,907 deaths recorded from small-pox against 59,996 in 1908, the death rate being only ·12 per thousand against 1·26. The highest death rate in districts was 1·06 per thousand in Mirzapur. Eight districts were free from the disease and in 20 others the number of deaths did not exceed ten. The highest death rate in towns was 2·70 per thousand in Ahraura in the Mirzapur district.

In the Punjab 3,352 deaths from small-pox, equal to a rate of ·17 per thousand, were registered in 1909, as compared with 28,652 deaths and a rate of 1·42 in 1908. The death rate for the year under review is the lowest since 1892. In 73 of the 134 towns no death from the disease was reported. The highest death rate in districts was ·70 per thousand in Mianwali and the highest in towns 4·25 per thousand in Zira, a small town, where the Vaccination Act is not in force. The death rate in towns to which that Act has been applied was only ·05 per thousand as compared with ·19 in the remaining towns.

In the North-West Frontier Province the number of deaths recorded as due to small-pox was 611 (·32 per thousand of the population) as compared with 734 (·38 per thousand) in 1908. All except 60 of the deaths were of children under ten years of age.

In the Central Provinces and Berar there were 4,155 deaths recorded from small-pox as compared with 9,044 in 1908, the death rate being ·35 per thousand as compared with ·75. In three of the 24 districts no death from the disease

was reported and the highest district death rate was 1·20 per thousand in Bilaspur. In one or two districts an increase in the recorded deaths from measles and chicken-pox is said by the provincial Sanitary Commissioner to throw some doubt on the accuracy of the small-pox statistics for those areas.

In the Madras Presidency small-pox accounted for 18,862 deaths (·5 per thousand of population) against 22,204 (·6 per thousand) in 1908. All the districts were more or less affected, the highest death rate recorded being 2·0 in Vizagapatam. In the remaining 21 districts the rate was below 1 per thousand. The urban death rate was only ·3 per thousand against ·5 in rural areas, as a result, it is said, of compulsory vaccination in municipalities.

In the Bombay Presidency the number of deaths from small-pox recorded during 1909 was 5,019 against 2,526 in the previous year and the death rate was ·27 per thousand against ·14. The disease was chiefly prevalent in the Western and Central Registration Districts. The highest death rate in districts was 1·01 in East Khandesh and the highest in towns 5·67 in Nasirabad. Poona, Nandurbar, Ahmedabad and the City of Bombay were also severely affected. It appears that in some districts opposition to vaccination is increasing.

In Burma only 1,011 deaths from small-pox were reported during 1909 against 1,298 during the previous year, 2,882 during 1907 and 8,540 during 1906. The highest mortality occurred during April, May and June. In the towns of Rangoon, Mandalay and Pegu the disease was somewhat severely prevalent.

In Ajmer-Merwara 16 deaths from small-pox were recorded during 1909, and in Coorg six deaths.

Plague.

In November and December 1908 the mortality from plague remained at a low level and the prediction was therefore made that the year 1909 would experience a comparatively mild epidemic. This prediction was fulfilled for although the number of deaths recorded throughout the country rose from 156,480 in 1908 to 178,808, this number was, with the exception of the number in that year, the smallest since 1900.

In the British provinces the number of plague deaths registered was 145,333 which is about three-fifths of the number recorded under cholera and about half as many again as the number recorded under small-pox. The course of the epidemic presented the disquieting feature of a return to the seasonal prevalence which characterized the epidemics from 1901 to 1904. During the first half of the year the maximum monthly mortality was attained in March, but the fall from April to July (which was, as usual, the month with fewest deaths) was neither so rapid nor so marked as in 1908. During the second half of the year the mortality rose steadily each month and of all the months of the year December was the one in which most deaths were recorded, the rise as compared with March being 28,734 deaths against 18,473. In the Native States the number of deaths aggregated only 33,475 which is less by about 9,000 than the number recorded in 1908, the decrease during the five early months of the year more than counterbalancing the increase during the four last months.

The mean death rate from plague in the British provinces was ·64 per thousand against ·50 in 1908 and 5·16 in 1907. As compared with 1908 the prevalence of the disease increased in the United Provinces, the Punjab, the Central Provinces, the Madras Presidency, Upper Burma and Ajmer-Merwara.

In the City of Calcutta the mortality rose from 1,779 to 2,117 and in Bombay it fell from 5,348 to 5,186. In Madras three deaths were recorded as compared with two in 1908.

Recent investigations.

The following statement embodies the chief conclusions which have been provisionally reached by the Advisory Committee for Plague Investigation in India as the result of the investigations made under their direction from 1905 to 1909 into the mode of spread of plague in India—

"(1) Considerable epidemics of human plague consist almost entirely of cases of bubonic plague and are directly dependent on the occurrence of epidemic plague in rats. The development of the rat epidemic precedes the human epidemic by an interval of about a fortnight. There is no evidence that any animals except rats play an important part in plague epidemics.

(2) *Epidemic plague in rats.*

(*a*) Rat fleas which have sucked the blood of a plague-infected rat can transmit the disease to healthy rats to which they are transferred. The plague bacilli multiply in the stomach of the flea, and the flea may be still capable of conveying infection three weeks after having imbibed plague-infected blood.

(*b*) If plague-infected rats are kept in close confinement along with healthy rats, no epidemic of the disease occurs in the absence of fleas. In the presence of rat fleas the disease spreads from the infected to the healthy animals, and the rapidity and severity of the epidemic so produced is in proportion to the abundance of rat fleas.

(*c*) Rats may be infected by feeding them upon the bodies of other rats dead of plague. The distribution of the lesions in the bodies of naturally-infected rats corresponds with that in rats experimentally infected by means of fleas and not with that in rats infected by feeding.

The Committee, therefore, conclude that *in nature plague is spread among rats by the agency of rat fleas.*'

(3) *Epidemic plague in man.*

(*a*) Bubonic plague is not directly infectious from man to man, as is shown by the experience of plague hospitals, where there is no tendency for the disease to spread from the sick to the attendants.

(*b*) Material epidemics of plague in man are always associated with epidemic plague in rats. Epidemic plague among rats provides a large number of infected rat fleas, and, owing to the mortality among the rats, brings these fleas on to human beings.

(*c*) Rat fleas (*pulex cheopis*) bite human beings, especially in the absence of their natural host.

(*d*) Rat fleas containing plague bacilli and found capable of transmitting plague to animals may be caught in plague-infected houses.

(*e*) Animals susceptible to plague (guinea-pigs, monkeys) placed in plague-infected houses if unprotected from fleas may contract the disease; whereas such animals under the same circumstances remain free from plague, if protected from fleas.

(*f*) The Commission have also performed numerous experiments with a view of testing other possible modes of infection, and have found that—

(i) In the absence of fleas no epidemic resulted when animals susceptible to plague (guinea-pigs) were kept in close contact with infected animals, although the animals took their food off floors grossly contaminated by the excreta of their infected companions.

(ii) Susceptible animals (guinea-pigs) caused to live upon and feed off floors artificially saturated with plague cultures failed to contract the disease.

(iii) The excreta of plague-infected patients may contain plague bacilli, but the bedding, etc., of plague patients soiled with excreta containing plague bacilli was not found to be infective to highly susceptible animals caused to live in and upon the bedding.

The Committee, therefore, consider that *in the great majority of cases during an epidemic of plague man contracts the disease from plague-infected rats through the agency of plague-infected rat fleas.*

(4) *The seasonal recurrence and spread of plague.*

(*a*) The Committee has obtained no evidence that under ordinary conditions the plague bacillus survives for more than a few days outside the bodies of men, animals or fleas.

(*b*) In large towns plague may persist throughout the year, since a few cases of acute plague in men and rats occur during the non-epidemic season.

(*c*) In villages there is no satisfactory evidence that such persistence is of other than exceptional occurrence, and it seems probable that the recurring annual epidemics in such places are due in most cases to fresh importation of the infection.

(*d*) There is no evidence that plague infection is carried for more than short distances by the spontaneous movement of rats. Plague appears to be commonly imported into a fresh locality about the persons of human beings, though the transference of infected rats and fleas in merchandise must be considered.

(*e*) In districts which suffer annual epidemics of plague, the rat epidemic, on which the human epidemic depends, occurs during some part of that season when the prevalence of fleas is greatest."

Plague in Bengal.

In Bengal plague has been diminishing for several years and in 1909 the deaths recorded from it amounted to only 11,779 as compared with 15,948 in the previous year. Deaths from the disease occurred in each month of the year and there was as usual a considerable rise in the number recorded during March, but the chief feature of the incidence was an unusually high incidence in December,

namely 3,071 deaths as compared with 2,343 in March. In thirteen districts no death from the disease was recorded and Monghyr was the only town in which it prevailed severely. Evacuation was the most popular of the many methods employed against the disease and was readily resorted to by villagers when plague appeared. Rat destruction was carried out in nearly all the plague infected districts and it is said that the people have begun to realize the advantages of that measure.

Plague in Eastern Bengal and Assam.

Eastern Bengal and Assam remained, as usual, free from indigenous plague during 1909 and only two imported cases were reported. The Plague Research Commission has begun to investigate the problem of the immunity of this province from the epidemic.

Plague in the United Provinces.

In the United Provinces the number of deaths recorded as due to plague during 1909 was 38,394 against 22,878 in the previous year. The figures give death rates of ·80 and ·48 per thousand, respectively. There was, as usual, a considerable rise of mortality in March, but, as in Bengal, the chief rise occurred in December when the deaths numbered 14,230 as compared with 4,384 in March. The districts chiefly affected were Ballia, Azamgarh, Unao, Muttra and Ghazipur. Twelve districts were free from the disease and in ten others very few deaths occurred. Among the towns with a population above 10,000 the highest mortality (21·95 per thousand) was recorded in Bansdih in the Ballia district and the next highest (19·30) in Purwa in the Unao district. In 74 towns no death from plague was recorded. The special measures introduced in 1907 for dealing with plague in these provinces cost during the financial year ending in 1909, Rs. 4,82,448. In a Resolution published in August 1909 the local Government noted that on account of the great decline in the mortality it had been possible to discontinue the measures nearly everywhere, but the severe recrudescence of the disease in the autumn rendered their re-adoption necessary in many places.

Plague in the Punjab.

In the Punjab the number of deaths attributed to plague during 1909 was 35,655 or a ratio of 1·77 per thousand as compared with a total of 30,708 and a ratio of 1·53 in 1908. An important feature of the seasonal incidence was the unusually high mortality during the last four months of the year. The districts most severely affected were Ferozepore, Hoshiarpur, Ludhiana, Hissar and Gurgaon, and among towns Anandpur with a death rate of 28·64 per thousand, Multan (17·82) and Chiniot (15·94) may be mentioned. Multan had previously been remarkable for its freedom from the disease. The measures relied upon were as usual rat destruction, evacuation, inoculation and disinfection, a special staff of 15 officers of the Indian Medical Service, 24 civil assistant surgeons and 30 hospital assistants being employed for the work. A feature of the anti-plague campaign in this province has been the organization of an auxiliary staff of workers chosen from among the leaders of the people. It is said that nearly 800 such workers have been trained.

Plague in the North-West Frontier Province.

The North-West Frontier Province was entirely free from indigenous plague during 1909 and apparently there were only four imported cases one of which was fatal. In 1908 there were 563 deaths recorded as due to plague.

Plague in the Central Provinces.

In the Central Provinces and Berar 19,216 deaths from plague were reported during 1909 as compared with only 6,236 in the previous year. The figures give death rates of 1·61 and ·52 per thousand, respectively. The disease was chiefly prevalent during the last four months of the year. The highest death rates in districts were 4·41 per thousand in Nagpur and 2·48 in Buldana, and among towns the death rates in Nagpur (57·09), Tumsar (47·56), Chikhli (43·47) and Mohpa (43·29) were the highest. Evacuation was freely resorted to in all districts, but in the town of Nagpur one sect of Muhammadans and some members of the weaver class refused for a long time to adopt the measure or to be inoculated and many of them died. Rat destruction is said to be less popular than evacuation. Over 46,000 anti-plague inoculations were done during the year.

Plague in Madras.

The number of deaths recorded from plague in the Madras Presidency was 3,844 as compared with 3,358 in 1908. Indigenous cases of the disease were reported from only seven of the 23 districts, the recorded death rate being highest (2·0 per thousand) in the Nilgiris district. Deaths from the disease were recorded in only 23 of the 232 town circles in the Presidency, the largest number in any town being 1,101 in Coimbatore. Segregation of patients and contacts and the surveillance during 7 days of persons arriving from infected places were employed in this Presidency in addition to evacuation, disinfection and rat destruction.

Plague in Bombay.

The number of deaths from plague in the Bombay Presidency during 1909 was 24,319 (1·32 per thousand of population) against 27,345 (1·48 per thousand) in 1908, the number being the lowest on record since the present epidemic became established. The decline was general throughout the Presidency. During the first half of the year the maximum prevalence of the disease was attained in March and during the second half in October. Six of the 25 districts were free from the disease and the highest death rate in any district was 4·42 per thousand in Satara. In 14 of the affected districts the death rate was below 1 per thousand and there were only seven towns with a death rate above 10 per thousand. In this Presidency inoculation is performed by travelling inoculators and private medical practitioners as well as at all civil hospitals and dispensaries. Evacuation was carried out by many village communities, but rat destruction was confined almost entirely to the Kaira collectorate and parts of the Satara and Belgaum collectorates.

Plague in Burma.

In Lower Burma the number of deaths attributed to plague fell from 5,169 in 1908 to 3,365, but in Upper Burma the number rose from 1,583 to 3,581. In both areas the disease was most prevalent from January to March. The towns in which most deaths occurred were Mandalay, Moulmein, Rangoon, Prome and Toungoo. In several areas a vigorous sanitary campaign which included the demolition of buildings affording shelter to rats was carried out.

Fevers.

In a normal year the number of deaths recorded under the heading "fevers"—which includes in many parts of the country nearly all the deaths that are recorded—is about 4½ millions and the death rate is about 19·5 per thousand. In 1909 the number was 4,487,492 and the rate 19·82. The decline as compared with the

abnormal year of 1908, when the number was nearly 5½ millions and the rate 23·96, occurred chiefly in the figures for the last four months of the year, but there was some decline in every month except February and March. Judging from the indications afforded by the statistics of troops the rise in those months was probably a result of the severe malaria epidemic that swept over the upper provinces of India in the autumn of 1908, and the fact that the rise was almost entirely in the United Provinces and the Punjab supports this view.

Fevers in Bengal.

In Bengal the conditions during 1909 were generally favourable and the death rate recorded under the heading "fever" fell from 23·18 in 1907 and 23·44 in 1908 to only 20·90, the total number of deaths being less by 128,467 than in the previous year. For the province as a whole 68·41 per cent of all the deaths were returned under the heading. The districts with the highest death rates were Darbhanga, Muzaffarpur, Bhagalpur, Shahabad and Darjeeling. In the Muzaffarpur district more than 80 per cent of all the deaths were recorded as due to fever. Anti-malarial operations were carried out by the local Government in the North Barrackpore municipality at a cost of Rs. 5,081, and by the municipal authorities in thirteen other towns. During the fever season nineteen civil hospital assistants were deputed to rural areas severely affected with malaria for the purpose of distributing quinine.

Fevers in Eastern Bengal and Assam.

The number of deaths attributed to fever in Eastern Bengal and Assam was 732,488 as compared with 667,146 in 1908, the death rate rising from 22·37 to 24·56. The death rates were highest in the districts of Jalpaiguri, Goalpara, Pabna and Dinajpur. In the town of Dinajpur an attempt was made to ascertain the causes of 131 deaths reported under the heading "fever." It was found that only 34 were probably due to malaria, the others being due to such causes as pneumonia, small-pox, cholera, dysentery, heart disease, respiratory disease, rheumatism, diarrhœa, carbuncle, puerperal fever and typhoid fever. The number of deaths attributed to kala-azar during the year was 1,703 against 1,786 in 1908. Most of the deaths from this disease were recorded in the Darrang, Sylhet and Kamrup districts.

Fevers in the United Provinces.

In the United Provinces the deaths recorded as due to fever were considerably more than might have been expected in a year like 1909 when the conditions in these provinces were, on the whole, very favourable. They numbered 1,475,570, equal to a death-rate of 30·94 per thousand as compared with a mean rate of 26·88 for the quinquennium ending with 1907. In comparison with the monthly figures of ordinary years there was a considerable increase from January to April and this may be attributed to the effects of the autumnal epidemic of malaria in 1908. The highest monthly figure of deaths occurred in January. The districts with the highest death rates were Hardoi, Mainpuri, Bareilly, Shahjehanpur and Bulandshahr. An officer was on special duty during the whole of the year and another during part of the year to investigate the causes to which the prevalence of malaria in certain parts of the provinces is due. Complete malarial surveys of several towns were made and the prevalence of the disease in the Naini Tal *terai* was investigated.

Fevers in the Punjab.

In the autumn of 1908 the Punjab was visited by an unusually severe epidemic of malaria the effects of which were apparent in the mortality returns for the first few

months of 1909. Afterwards, however, the mortality from fevers was not excessive and for the whole year the death rate was only 20·40 per thousand as compared with 34·66 in 1908 and 20·16 in 1907. The total number of deaths recorded under this heading was 410,273 which is 66 per cent of all the deaths recorded. The provincial Sanitary Commissioner considered that during April, May, and possibly June, many deaths from plague were returned under the heading "fever" and stated that this is usually the case "as those reporting deaths are less inconvenienced if they report them as having been caused by fevers." The districts with the highest death rates under this heading were Multan, Delhi and Muzaffargarh. The provincial Sanitary Commissioner reports that the type of fever prevailing during the year was mild. Typhus fever is said to be endemic in the Dera Ghazi Khan district.

Fevers in the North-West Frontier Province.

In the North-West Frontier Province only 39,403 deaths from fevers were recorded during 1909, as compared with 50,795 during 1908, the ratios per thousand of population being 20·65 and 26·62, respectively. The greatest number of deaths under this heading were recorded in January. The autumn was unusually healthy.

Fevers in the Central Provinces.

The number of deaths ascribed to fevers in the Central Provinces and Berar in 1909 was 180,544 and the death rate 15·08 per thousand as compared with a total of 217,773 and a rate of 18·16 in 1908. The decrease was shared by all except two of the 24 districts. The highest death rate in districts was 24·87 in Damoh, but in that district over 70 per cent of all the deaths were recorded under the heading; the lowest death rates were 6·38 in Akola and 6·45 in Buldana; in those districts only 17 and 16 per cent respectively, of all the deaths were recorded under the heading. Minor anti-malarial measures were carried out in the head-quarter towns of some districts.

Fevers in Madras.

In the Madras Presidency the death rate recorded from fevers was only 7·3 per thousand which is much lower than in any of the other chief provinces. Most deaths were recorded as usual in December but the number varied little from month to month. The death rates recorded in districts ranged from 15·8 per thousand in Vizagapatam to 1·0 in Anantapur. It is said that several municipalities and district boards made liberal allotments for carrying out anti-malarial operations.

Fevers in Bombay.

In the Bombay Presidency the number of deaths recorded as due to fevers was 223,888 (12·11 per thousand of population) against 243,372 (13·17) in 1908. The number is the lowest recorded since 1898. The death rates were highest in the districts of Ahmedabad, Broach and Larkhana. Minor anti-mosquito measures were carried out in a few municipalities.

Fevers in Burma.

In Lower Burma the death rate from fevers in 1909 was 9·44 per thousand as compared with 9·63 in 1908 and in Upper Burma it was 9·47 as compared with 8·23. The provincial Sanitary Commissioner notes that in some of the districts visited by him he found very little evidence that malaria is prevalent.

In Ajmer-Merwara 15,809 deaths were ascribed to fevers in 1909, the rate being 33·15 per thousand against 30·79 in 1908. In Coorg the number was 4,113 and the rate 22·77 as compared with a rate of 27·84 in the previous year.

Fevers in Ajmer-Merwara and in Coorg.

In a number of provinces systematic endeavours to extend the benefits of quinine have been, and are being, made. The following summary relates to the efforts made during 1909 only.

Free distribution and sale of quinine.

In Bengal 19 civil hospital assistants were deputed to areas severely affected by malaria for the purpose of distributing quinine during the fever season. They distributed the drug in 36 of the most unhealthy *thanas* of which ten are in the district of Murshidabad, eleven in the district of Nadia, four in Jessore, five in the 24-Parganas, five in Purnea and one in Birbhum. As regards the sale of quinine the local Government appointed a committee to formulate new proposals and in accordance with their recommendations the following measures were introduced from July, when the direct supply to post offices by the Jail Department was discontinued:—(1) a central depôt was established in each district for the supply of quinine to postmasters and other retail vendors; (2) the quantity of quinine in each pice-packet was increased from 7 to 10 grains; (3) the quinine was issued in tablets as well as in powders; each tablet contains $3\frac{1}{2}$ grains and three are sold for one pice; (4) the pice-packets were made up in parcels of 100 packets. It is said that the new system is working satisfactorily and that the demand for pice-packets is increasing in many places. During the year 25,514 parcels of 100 or 102 pice-packets were sold against 13,307 parcels in 1908. In addition 4,818 phials each containing 300 tablets were sold.

In Eastern Bengal and Assam nearly $3\frac{3}{4}$ million pice doses of quinine in powder or tablet form were sold during 1909 chiefly by postmasters, school masters, village panchayats, shop-keepers, vaccinators and chaukidars. Since the close of the year a new scheme for the sale of quinine has been adopted in this province. Its chief feature is the substitution for the pice-packet system of a system in which the minimum amount of quinine to be sold is sufficient for the treatment of an attack of malarial fever. On the Assam tea-gardens a large amount of quinine is distributed free of charge.

In the United Provinces a committee was appointed to consider various problems connected with the free distribution and sale of quinine and on their recommendation the following measures were adopted:—(1) a plan for securing the early notification of increased prevalence of malaria in any part of the province; (2) a plan for securing the effective distribution of quinine free of charge during an epidemic of malaria; (3) the maintenance of a reserve stock of quinine sufficient for requirements during the early period of an epidemic; (4) the increase of the amount of quinine in the pice-packets to nine grains; (5) the experimental issue of three-grain tablets, the price of three such tablets being one pice; (6) the extension of the agencies for the sale of quinine. In 1909 the total number of pice-packets sold by postmasters, vaccinators, landlords and other agencies was 2,231,429.

In the Punjab 424 pounds of quinine were distributed gratuitously by 13 municipalities and 2,113 pounds by 24 district boards. In the Hoshiarpur district

Rs. 550 were collected by public subscription and spent on quinine which was distributed gratuitously. In the Gurgaon district various subordinate officers were supplied with powders and tablets of quinine for sale at three pies per packet. In Gurdaspur a society for the distribution of quinine established by the Deputy Commissioner proved very successful.

In the Central Provinces and Berar 3,720 parcels of quinine, each containing 102 seven-grain powders, were sold in 1909 as compared with 3,312 in 1908.

In the provincial Sanitary Report of the North-West Frontier Province it is stated that large quantities of quinine in the form of five-grain tablets were purchased and supplied to local boards and political agents for free distribution among the people.

In Burma 1,053,360 seven-grain pice doses of quinine were sold through the agency of district officers and vaccinators and 298,012 doses through the agency of post offices.

Dysentery and Diarrhœa.

In 1909 the number of deaths recorded under the heading "dysentery and diarrhœa" was lower than in any year since 1898, and the recorded death rate was only ·96 per thousand as compared with 1·26 in 1908. In Bengal only 35,981 deaths under this heading were recorded as compared with 64,899 in 1908, the death rates for the two years being ·71 and 1·28 per thousand, respectively. In the United Provinces the number of deaths fell from 19,388 to 14,260 and in the Punjab it fell from 21,103 to 10,416, this number being the lowest on record for the province. In the Central Provinces and Berar 33,386 deaths were recorded as compared with 40,760 in 1908, all except three of the districts sharing in the decrease. In the Madras Presidency the death rate in 1909 was 1·3 per thousand against 1·7 in 1908 and in the Bombay Presidency it was 1·90 against 2·21. Eastern Bengal and Assam, the North-West Frontier Province, and Upper Burma were the only provinces in which the mortality under this heading was higher than in 1908. In Eastern Bengal and Assam the death rate was ·87 per thousand as compared with ·83, all except eight of the districts contributing to the increase. Lakhimpur, Darrang, and Sibsagar were the districts with the highest death rates, namely, 7·25, 6·73 and 6·62 per thousand, respectively. In the North-West Frontier Province 407 deaths were recorded under the heading as compared with 320 in 1908 and in Upper Burma 3,235 as compared with 1,975.

General History of Vaccination.

(For Statistical Tables *see* page 156.)

Vaccination in India.

The total number of vaccinations performed during 1909-10 was 9,090,586, about 30,000 fewer than in the preceding year. The decrease was, however, confined to the United Provinces (65,824), the Central Provinces (30,041), Bombay (10,894) and Ajmer-Merwara (841). The vast majority of the operations were, as usual, primary, which numbered 8,096,233, or 65,064 fewer than in 1908-09; the number of revaccinations was 994,353, or 32,288 more than in 1908-09.

In only Burma and Coorg were both primary vaccinations and revaccinations more numerous than in 1908-09; the numbers of primary operations declined in six provinces and the numbers of revaccinations in seven. Not only were operations generally somewhat less numerous than in 1908-09, they were less successful, primary operations succeeding at the rate of 94·62 per cent compared with 97·47, and revaccinations at the rate of 66·58 per cent compared with 73·44. The mean number of operations performed per vaccinator fell from 1,507 in 1908-09 to 1,477, the figures ranging from 2,831 in the North-West Frontier Province to 1,083 in Bengal and 797 in Ajmer-Merwara.

The vaccination done at dispensaries continues to decline, the total of 191,242 operations performed in 1908-09 falling to 156,478. The decline last year was general, except in the Punjab and Bombay, but it merely indicates a transfer of work formerly done by operators attached to dispensaries to the special staff.

The proportion of the total population vaccinated during the year was 35·55 per thousand compared with 35·93 in the previous year, but there are great differences in the several provinces, the extremes being reached in the small provinces of Coorg, 56·77, and Ajmer-Merwara, 24·34. In the larger provinces the range was from 47·36 in the North-West Frontier Province to 27·45 in the United Provinces. If we take the general birth rate of India at 40 per thousand, 44·20 per cent of the theoretically available infants were successfully vaccinated during the year. This is a considerable advance on the figure for the previous year, 43·87, and is not far short of the record figure 44·36 established in 1907-08. Here again the range in the provinces is extensive, from 76·51 in the Central Provinces to 20·68 in Burma and 9·77 in Coorg.

The cost of the vaccination department in 1909-10 was £104,299, or about £3,600 more than in the preceding year, all the provinces, except Bengal, the United Provinces and the Central Provinces, contributing to the increase. The mean cost of each successful case was 3*d.*, or $\frac{1}{6}d.$ more than in 1908-09. In the several provinces, owing of course largely to diversity of practice, the cost of each successful case varied greatly, from $8\frac{5}{6}d.$ in Bombay and $8_{1}^{5}{}_{2}d.$ in Burma, to $1\frac{3}{4}d.$ in Bengal and $1\frac{1}{3}d.$ in Eastern Bengal and Assam.

Lymph supply.

Details of the varieties of lymph in use will be found in the paragraphs relating to the several provinces. The opening of the very extensive depôt for vaccine manufacture at Belgaum had to be postponed; and it was decided that owing to

financial stringency the existing laboratory at Lahore must for the present suffice for the needs of the Punjab.

Bengal.

There was again an increase in the number of operations in Bengal, the total being 2,053,773, or an increase of 34,242; but the increase was limited to primary operations, which numbered 1,868,585 against 1,810,213 in the previous year, while revaccinations decreased in number from 209,318 to 185,188. In both years the work done in the Tributary States of Orissa is excluded. In 19 of the 34 districts there was an increase, the most noticeable being Cuttack (increase 23,088), Midnapore (17,051), Jessore (13,260) and Purnea (12,213). The increase in Cuttack and Midnapore is attributed to greater personal exertions of the vaccination staff and to help given by the Magistrate at Midnapore. The increase in other districts is ascribed to the efforts of the vaccination staff to cope with outbreaks of small-pox and to easier times permitting the people to pay the fees of licensed vaccinators. The larger decreases occurred in Nadia (7,839), Shahabad (7,149), Singhbhum (6,260), Puri (5,816) and Manbhum (4,904) and are ascribed to inefficiency of the staff in Nadia, the occurrence of plague and severe malarial fever in Shahabad, and in Puri the relaxation of the special exertions necessary in recent years. No explanation is given of the falling off in Singhbhum and Manbhum. The percentage of success in primary cases fell from 99·34 per cent in 1908-09 to 98·97, while the percentage of success in revaccinations rose from 61·78 per cent to 63·26. The mean number of operations performed by each vaccinator was 1,083, the work of the paid men being generally greater in quantity and better in quality than that of the licensed men. The system of realising vaccinators' fees through village *panchayets* was not very successful because of the absence of legal powers to enforce payment. Owing to the diminished prevalence of small-pox the number of persons vaccinated by vaccinators attached to municipalities, dispensaries, etc., fell from 142,781 in 1908-09 to 129,971, and the mean number of operations performed by each vaccinator from 819 to 735. The percentages of success fell in primary cases from 98·60 to 98·20 and in revaccinations from 60·39 to 57·31. At factories and on tea-gardens, however, the numbers of primary operations increased from 2,945 to 3,961, although the revaccinations fell from 1,403 to 671. Infant vaccination continued to improve, and the percentage protected of an estimated birth rate of 40 per thousand rose from 43·91 in 1908-09 to 48·16. In 24 districts upwards of half the number of infants available were protected.

Vaccination was performed with calf lymph (calf to arm), lanoline calf lymph and human lymph (arm-to-arm) and the results are displayed in the following table:—

	Primary cases.		Revaccinations.	
	Number.	Percentage of success.	Number.	Percentage of success.
Calf lymph	43,713	98·46	11,846	66·82
Lanoline lymph	932,528	98·35	146,411	60·22
Human lymph	829,737	99·00	12,978	69·17

In Calcutta and in parts of the Howrah, Nadia and Jessore districts operations were performed with glycerine lymph, the ratios of success being 97·07 per cent in primary cases and 47·17 per cent in revaccinations.

The cost of the department fell from £14,515 in 1908-09 to £14,246 but the mean cost of each successful case rose by $\frac{1}{6}d.$ to $1\frac{3}{4}d.$ At the vaccination depôts in Calcutta and Darjeeling 520,114 and 63,210 grains of vaccine were manufactured, an increase of 99,169 and a decrease of 5,863 grains on the outturn of the preceding year. As usual, supplies were sent to the Nepal Darbar and the Sikkim State.

Eastern Bengal and Assam.

The total number of vaccinations performed, including 7,547 secondary operations, was 1,464,601. This total is higher by 12,341 than in the previous year, but compared with 1908-09 primary operations decreased by 50,260 to 1,301,574 while revaccinations increased by 62,601 to 163,027. In twelve districts the numbers of operations increased, most notably in Dinajpur (48,609), Rangpur (7,873), Malda (7,708) and Bogra (4,130) in all of which, except Malda, small-pox was prevalent, and as might be expected the increase was most marked in revaccinations. Among the fifteen districts in which the figures declined, the falling off was greatest in Pabna (18,068), the Khasi and Jaintia Hills (12,473), Faridpur (9,195) and Sylhet (7,528). In the Khasi and Jaintia Hills the decrease appears to have been due to a reduction in the staff; in all the other districts the decrease is attributed to the prevalence of malarial fever rendering the children unfit for operation. Not only did the number of primary cases decline, but there was a falling off in the percentage of success from 98·76 to 96·21; although revaccinations were more successful than in the previous year, the rate being 75·61 against 74·26 per cent. Dispensary vaccination continued to decline, primary operations falling from 3,331 with a percentage of success of 96·62 to 2,854 with a percentage of success of 91·89, and revaccinations from 1,290 (percentage of success 74·96) to 459 (79·95). On tea-gardens the number of primary operations fell from 19,051 in 1908-09 to 9,500, but the number of revaccinations rose from 807 to 1,934, success being claimed in 1909-10 at the rates of 89·22 and 82·25 per cent, respectively. Taking a hypothetical birth rate of 40 per thousand, 28·92 per cent—compared with 30·65 in 1908-09, of the children were successfully vaccinated. In the towns 54 per cent of the children said to be available were protected, compared with 66 per cent in the preceding year. Considerable improvement took place at Dacca, but in the towns of the Mymensingh district there is still a strong prejudice against the early vaccination of infants.

Glycerinated vaccine prepared at the Shillong depôt was exclusively used and the supply was satisfactory except in October and early in November when many failures were reported, the cause of which is suspected to be the extensive use of a large supply manufactured in August. In future no vaccine prepared before September will be issued for use in the following season. The number of tubes of vaccine loaded was 2,145,024 and the cost $\frac{1}{6}d.$ a tube.

The cost of the department rose from £7,374 in 1908-09 to £7,600 and the cost of each successful operation from $1\frac{1}{4}d.$ to $1\frac{1}{3}d.$

United Provinces.

In 1908-09 the great epidemic of malaria and scarcity locally had a disastious effect upon the numbers of vaccine operations performed in these provinces; in 1909-10

the effects of the malaria epidemic continued to impair the work of the department, the birth-rate was lowered and many children were in too poor health to be vaccinated. The number of primary operations fell from 1,325,443 to 1,279,472, and the number of revaccinations from 131,342 to 111,489. The percentages of success, however, rose from 96·49 to 97·56 in primary operations, and from 80·84 to 82·54 in revaccinations. The total operations were more numerous than in the preceding year in 16 districts, but the differences in the figures of the two years were generally inconsiderable; the greatest increases being 7,771 in Jhansi and 5,262 in Partabgarh, and the largest decreases 10,010 in Sitapur, 9,055 in Almora, 7,935 in Gorakhpur, 6,927 in Ballia and 6,925 in Naini Tal. At dispensaries only 253 operations were performed compared with 765 in the preceding year and 1,442 in 1907-08. Estimating the births at 40 per thousand of the population, 40·50 of the available infants were protected, compared with 41·39 in 1908-09. In the municipal towns about 98 per cent of the available children were successfully vaccinated, but in the totals from which this proportion is calculated were included children brought from the country into the towns to be vaccinated.

The Bovine Lymph Depôt at Patwa Dangar continued to be satisfactorily managed. The amount of lymph obtained from 66 cow and 45 buffalo calves was 5,157·6 grammes, cow calves yielding on an average 33·2 grammes and buffalo calves about twice as much. From the crude lymph 22,941·6 grammes of glycerinated lymph, 1,713·4 grammes of glycerine paste and 37·2 grammes of lanolinated lymph were prepared. The strain of lymph was satisfactory, the figures of success in primary cases being 95·6 per cent from October 1909 to March 1910 and 84·3 per cent in the period from April to September 1909. The lymph was, however, frequently fortified by passage through rabbits. A strain of lymph obtained from Berlin was started, but the vesicles were poor, so it was given up. Attempts were made to overcome the difficulty of transporting lymph in the hot weather by using Thermos flasks, but the shape of those that were available was not convenient and frequent breakages led to their disuse.

The cost of the department fell from £11,842 in 1908-09 to £11,423, but the average cost of each successful case remained unaltered at $2\frac{1}{2}d.$

Punjab.

Although hampered by the presence of plague, the various agencies in the Punjab performed 670,536 operations compared with 668,898 in 1908-09. There were 528,347 primary operations in 1909-10 compared with 523,087 in the preceding year, and 142,189 revaccinations compared with 145,811. The percentages of success declined from 98·43 to 97·58 in primary cases and from 76·93 to 74·32 in revaccinations; the falling off was ascribed to the lymph supplied in October and early November being injured by the heat. The trial of house-to-house vaccination, to which reference was made last year, shows that while the system is popular in some districts it is very unpopular in others and is impracticable in the hills. It has accordingly been decided to continue the system only in these districts and towns in which it has proved a success.

On the hypothetical birth rate of 40 per thousand, 49·58 per cent of the available infants were successfully vaccinated, against 51·49 and 56·51 per cent in the two preceding years. In towns in which the Vaccination Act is in force 79 per cent of the infants under one year of age were protected, com-

pared with 82 per cent in 1908-09, the corresponding figures in towns in which the Act is not in force being 62 and 64 per cent. The provincial Sanitary Commissioner having noted the comparative neglect of the provisions of the Act in Lahore, Delhi and Amritsar, the local Government has drawn the attention of the municipalities to the matter.

There were 19,557 tubes of chloroformed glycerinated lymph issued during the year, and from the returns received it appears that 639,263 primary operations and 141,018 revaccinations were performed with it. In primary cases the case success was 96 per cent and the insertion success 95 per cent; in revaccinations the case success was 72 per cent and the insertion success 68 per cent. These figures are somewhat less favourable than last year, the falling off being attributed to a deterioration of the supply in October and early November on account of the high temperature.

It has been decided to make some alterations in the laboratory at Lahore and to postpone for the present the provision of a new institute.

The cost of the department increased from £7,651 in 1908-09 to £8,034, and the cost of each successful case from $3\frac{1}{2}d.$ to $3\frac{1}{4}d.$ These figures do not, however, take into account the amount realised by the sale of vaccine which was £769; if this sum is deducted from the cost of the department the cost of each successful case is reduced to $2\frac{1}{4}d.$

In the larger Native States which employ their own vaccinators, the following numbers of operations were performed:—Patiala, primary 42,047 (against 42,500 in 1908-09), revaccinations 26,643 (24,106); Bahawalpur, primary 13,043 (8,344), revaccinations 139 (119); Kapurthala, primary 4 238 (3,651), revaccinations 33 (49); Jhind, primary 5,453 (6,168), no revaccinations; Nabha 843 (1,607), no revaccinations; Faridkot, primary 3,071 (3,485), revaccinations 12 (52). In primary cases the percentages of success varied between 99·60 in Kapurthala and 85·62 in Nabha.

North-West Frontier Province.

The total number of operations performed was 102,567, or 11,199 more than in 1908-09; the number of primary operations increasing by 13,520 to 94,701, while the number of revaccinations decreased by 2,321 to 7,886. The percentages of success were much the same as in the previous year, 98·67 in primary cases and 82·76 in revaccinations. Primary operations were more numerous than in 1908-09 in all districts except Hazara, where the decline is ascribed to lack of energy in furthering the cause of vaccination on the part of municipal members, *zaildars* and others. The numbers of revaccinations fell off most noticeably in Kohat owing to the apathy of the native superintendent of vaccination who has been reduced, and in Bannu owing to unavoidable changes in the establishment. A total of 651 primary operations, with success at the rate of 94 per cent and 15 revaccinations, all successful, were performed at the dispensaries at Tank, Mastuj (Chitral) and Idak. In the Political Agencies the number of operations fell from 10,127 in 1908-09 to 9,405, the decrease being mostly due to diminished work in the Sherani country. There was, however, an increase in the work done in the Kurram and Tochi Agencies; in the former owing to the prevalence of small-pox and the disfavour into which inoculation is falling; in the latter it is said that the attitude of the people towards vaccination is improving. An outbreak of small-pox in and around Dir prompted the Nawab to ask for the services of a vaccinator. A man was sent and vaccinated 480 persons. Estimating the birth rate at 40 per thousand,

70·3 per cent of the infants were protected, compared with 60·49 per cent in the previous year. In most of the towns the number of children vaccinated was in excess of the estimated number available ; this was due to many of the trans-border tribes and nomads having their children vaccinated when passing through the towns.

Almost all the operations were performed with chloroformed glycerinated lymph. Human lymph was used only in 200 cases in the Sherani country and among *Powindahs* passing through Dera Ismail Khan.

The cost of the department rose from £838 to £983, but the cost of each successful case was the same as in the previous year, namely, $2\frac{5}{12}d.$

Central Provinces.

Owing to unfavourable circumstances—a low birth rate, the occurrence of plague especially in the Southern and Western districts, extensive migration of the people on account of the large number of marriage feasts in the season following *Sinhast*, the discontinuance of vaccination by sub-assistant surgeons, and political disturbances in the Bastar State, the number of operations was less by 30,041 than in 1908-09. The total of 609,606 operations included 535,697 primary with success in known cases at the rate of 99·15 per cent against 98·78 in the previous year, and 73,909 revaccinations with success at the rate of 77·67 per cent against 75·66 per cent in the previous year. Primary operations performed by the district staff numbered 466,693 against 462,134 in the previous year, the principal increases being in Bilaspur (5,917), Raipur (4,499) and Bhandara (3,130). In the Feudatory States the number of primary operations fell from 69,105 in 1908-09 to 63,981 owing to the small amount of work done in Bastar. Revaccinations in the *Khalsa* numbered 65,811 against 75,807, and in the Feudatory States 6,523 against 7,026, the decrease being largely due to the lessened prevalence of small-pox. At dispensaries, including those in the Feudatory States, only 5,023 primary operations and 1,575 revaccinations were performed compared with 22,199 and 3,376 in the preceding year, the percentages of success being 94·82 and 74·22 against 97·40 and 59·09 in 1908-09. The reduction in the numbers of cases is due to the discontinuance of vaccination by sub-assistant surgeons attached to dispensaries.

Estimating a birth rate of 40 per thousand, 76·51 per cent of available infants under one year of age were protected, compared with 76·98 in the previous year. In towns 85·3 per cent of the infants were successfully vaccinated against 91·70 in the preceding year. Glycerinated calf lymph prepared at district head-quarters was used exclusively. The cost of the department fell by £311 to £4,521. In British districts the cost of each successful case was $1\frac{1}{12}d.$, and in the Feudatory States $1\frac{1}{2}d.$

Madras.

The total number of vaccinations was 1,652,028 or 2,623 more than in 1908-09, but the number of primary operations fell from 1,478,771 to 1,447,328, so that the increase was entirely due to revaccinations the number of which rose from 170,634 to 204,700. There were considerable increases in the work done in Kistna (8,906 cases), South Canara (8,833), Ganjam (7,495), Guntur (5,567), North Arcot (5,547) and Tinnevelly (2,290) ; and decreases in Vizagapatam (20,413), due to the very large number vaccinated in the previous year when small-pox was prevalent, in Cuddapah (8,456), due to the prevalence

of malarial fever, in Godaveri (5,741), due to the reduction in the special staff employed in the previous year, in Anantpur (5,605), due to reduction in the number of vaccinators, in South Arcot (5,005), due to epidemics of cholera, fever, measles and chicken-pox, and in Coimbatore (3,226), due to the occurrence of plague and the absence of vaccinators for whom substitutes were not provided. The ratios of success were lower than in 1908-09, the percentages falling from 95·48 in primary cases to 92·08 and from 81·37 in revaccinations to 77·58. Only 18 primary operations and three revaccinations were performed at one dispensary.

Estimating the birth rate at 40 per thousand, 39·84 per cent of the available infants were successfully vaccinated; compared with 40·98 per cent in the previous year. In municipal towns the percentage of infants protected fell from 68·7 in 1908-09 to 66·6 per cent. Excluding cases in which the results were unknown, 1,281,505 primary operations were performed in local fund areas, and 85,215 primary operations were performed in municipalities with lanoline lymph with percentages of success of 91·7 and 95·4 respectively; 24,200 primary operations were performed in Madras City with glycerinated lymph with success at the rate of 98·7 per cent. The efficiency of the lymph used was not so great as in 1908-09, partly owing to defect in storage, for it has been found impossible to maintain the temperature in the storage boxes continuously near zero centigrade, but mainly owing to local causes. Arrangements have been made to maintain a reserve stock of lymph, the necessity for which is apparent when it is explained that on several occasions for weeks at a time no calves could be obtained.

The cost of the department rose from £21,450 in 1908-09 to £21,852, and the cost of each successful case from $3\frac{5}{12}d.$ to $3\frac{2}{3}d.$

Coorg.

The number of vaccinations performed rose from 10,482 in 1908-09 to 11,971 and consisted of 9,121 primary operations and 2,850 revaccinations, which succeeded, respectively, at the rates of 92·67 and 74·93 per cent.

Taking the birth rate at 40 per thousand, only 9·77 per cent of the available infants were protected compared with 12·15 in the preceding year; in the towns, however, 157 of 166 available children were protected. Calf lymph was used exclusively.

The cost of the department, £188, was almost the same as last year, but the cost of each successful case fell from $5d.$ to $4\frac{5}{12}d.$

Bombay.

There were vaccinated primarily during the year 665,602 or 6,650 fewer persons than in 1908-09, the falling off occurring in Sind, where increasing opposition to vaccination and greater difficulty in obtaining vaccinators is being encountered, and at Aden, where there were an unusually large number of operations performed in 1908-09 on account of the prevalence of small-pox. The number of persons revaccinated also decreased by 3,464 to 48,961, the number of operations being smaller in the Central and Southern Registration districts and at Aden. Primary operations were successful at the rate of 98·96 per cent and revaccinations at the rate of 70·86 per cent against 96·02 and 70·65 in the preceding year. There was an increase in the number of operations at dispensaries where 1,001 primary and 1,269 revaccination operations were performed of which 90·00 and 66·16 per cent were, respectively, successful.

On the estimated birth rate of 40 per thousand, 57·02 per cent of the children available were protected, compared with 54·86 per cent in 1908-09. The Vaccination Act is in force in only seven of the 107 municipal towns, but taking all the towns together a larger number of infants were vaccinated than the number calculated to be available.

The completion of the buildings of the Vaccine Institute was delayed and work had to go on in the temporary buildings. In spite of this there was an increase in the outturn of glycerinated lymph and the success obtained with it was high—in primary operations the case success was 99·22 per cent and the insertion success 95·33 per cent; as the provincial Sanitary Commissioner remarks "it is gratifying to find that with improved methods of storage under ice and of "packing, the success attained in the hottest months of the year was generally "good." The following table extracted from Lieutenant-Colonel Dyson's report shows the varieties of lymph used in the several 'districts' of Bombay and the degree of success attained in them with each variety.

Districts.	Kind of lymph used.	Number of operations.		Successful cases excluding "unknown."		Percentage of success excluding "unknown."	
		Primary.	Revaccination.	Primary.	Revaccination.	Primary.	Revaccination.
Western Registration District	Human ...	186	27	168	23	100·00	100·00
	Glycerinated ...	124,350	11,326	113,817	6,462	93·72	74·73
Presidency Circle ...	Animal ...	5,928	3,362	5,400	34	99·15	31·78
	Glycerinated ...	14,046	6,990	12,635	71	97·35	24·83
Central Registration District	Human ...	4,871	58	4,629	45	99·33	95·74
	Glycerinated ...	151,976	4,416	138,948	2,089	99·74	71·54
Southern Registration District	Human ...	18,040	734	18,017	532	99·96	74·82
	Animal ...	4,174	154	4,121	141	98·87	91·56
	Glycerinated ...	120,992	13,615	115,207	7,329	99·28	70·82
Gujarat Registration District	Human ...	29,528	1,340	29,123	980	99·07	73·85
	Glycerinated ...	93,428	3,715	87,778	1,671	99·01	59·53
Sind Registration District ...	Human ...	77,290	1,497	69,310	967	98·71	88·96
	Animal ...	6,059	890	5,861	292	99·64	73·55
	Glycerinated ...	2,287	364	1,833	200	93·38	70·92

The cost of the department increased by £1,374 to £23,198 owing to increased pay of officers, the grant of pony allowance to a few vaccinators, the entertainment of additional staff and compensation to menial servants for the enhanced price of grain. The mean cost of each successful case was $8\frac{5}{8}d.$ against $8\frac{5}{12}d.$ in 1908-09.

Burma.

The number of vaccinations performed in 1908-09 exceeded the number performed in the preceding year by 11,292 and totalled 407,705, made up of 353,616 primary operations and 54,089 revaccinations. In primary cases success was attained at the rate of 95·26 per cent against 93·59 in the preceding year and in revaccinations at the rate of 62·81, against 59·99. In 25 districts the amount of work done increased, and it decreased in 15, among which were

Kyaukpyu (4,135) and Akyab (2,699) where the decrease is attributed to apathy of the people in the absence of the stimulus caused by the presence of small-pox in the earlier year; Prome (1,274) owing to epidemics of plague and cholera; Tavoy (4,066) owing to the diminished zeal of vaccinators; Sagaing (2,014 revaccinations) and Lower Chindwin (2,478) owing to the presence of plague and cholera; Upper Chindwin (918) and Thayetmyo (1,388) owing to the spread of rumours in connection with the occurrence of plague. The cause of a decrease of 2,857 operations in the Southern Shan States is not explained. At dispensaries 5,475 primary operations and 6,786 revaccinations were performed with percentages of success of 94·82 and 70·03.

On an estimated birth rate of 40 per thousand, 20·68 per cent of the available children were protected, compared with 21·07 per cent in the preceding year. In municipal towns 78·2 per cent of the infants calculated to be available were successfully vaccinated.

The Vaccine Depôt supplied glycerinated lymph sufficient for 614,644 operations and the quality was good, 95·0 per cent of the cases operated on succeeded, compared with 93·0 and 91·2 per cent, respectively, in the two preceding years. It was found that vaccine in capillary tubes sealed by heat gave results that were 3·5 per cent better than vaccine in tubes sealed with wax. Eight native superintendents of vaccination and 38 apprentice vaccinators were trained at the depôt during the year.

The cost of the department rose by £2,062 to £12,052, and the mean cost of each successful case by 1*d.* to $8\frac{5}{12}$*d.* The increase in cost was due mainly to an increase of establishment.

Ajmer-Merwara.

In Ajmer-Merwara 11,875 primary operations and 85 revaccinations were performed during the year, compared with 12,497 and 304, respectively, in 1908-09. The percentage of success in 1909-10 in the two classes of operations were 97·12 and 87·06.

On an estimated birth rate of 40 per thousand 47·76 per cent of the available children were protected compared with 52·90 per cent in the previous year.

The cost of the department rose from £198 in 1908-09 to £202, and the cost of each successful case from $3\frac{5}{6}$*d.* to $4\frac{1}{6}$*d.*

Sanitary Works.

Bengal.

Excluding Calcutta, the number of municipalities in Bengal in 1908-09 was 128, an increase of one—Khagole, in the Patna district—during the year. The aggregate income, including opening balances amounting to £88,036, was £4,91,542, of which 39·67 per cent was spent on original and recurring sanitary works, 8·19 per cent on roads, 4·20 per cent on the public safety and 26·55 per cent on all other requirements. The actual sums expended were the following: on conservancy, including road watering, establishment, latrines, etc., £93,597; and on water-supply, £28,923; on drainage, £23,973; the increase of expenditure under these three heads amounting to £16,570. The increased expenditure on conservancy (£4,237) and water-supply (£6,282) was shared by all the divisions, but the increased expenditure on drainage (£6,051) was mainly due to the construction of drains and the preparation of schemes in the Presidency, Burdwan and Bhagalpur divisions. Nearly the whole of the annual grant of £30,000 sanctioned by the Government of India for expenditure on sanitary improvements was allotted during the year or shortly after its close, the greater part of the money being apportioned among the following municipalities for drainage: Burdwan, £3,333; Monghyr, £6,667; Arrah, £1,667; Tittaghar, £1,333; Berhampore, £2,067; Daltonganj, £1,067; Bankura, £667; Hazaribagh, £667. The municipality of Darjeeling received £3,333 for a sewage scheme and the municipalities of Jessore and Gaya received £2,933 and £1,667 for water-supply schemes, while the South Suburban municipality received £800 for improvements to its water-supply. A sum of £1,333 was set aside for dredging the Bhagirathi near its take-off from the Ganges.

The expenditure on sanitary works by Government, municipalities, district boards and private individuals amounted to £86,362, compared with £58,861 in the preceding year.

Sanitary Board.

The Board held three meetings during the year at which the principal subjects of discussion were (*a*) the Howrah drainage scheme, (*b*) the Darjeeling water-supply and sewerage scheme, (*c*) a proposed increase in the office establishment of the Board, (*d*) draft rules to regulate the duties and powers of the sanitation committees constituted under the Local Self-Government Act of 1885 and Bengal Act I of 1908, and (*e*) the qualifications of Sanitary Inspectors to be employed by district boards. On the 25th March 1909 the duties of Sanitary Engineer and Secretary to the Sanitary Board were taken over by Mr. G. B. Williams, M.I.C.E., appointed by the Secretary of State.

Work was in progress during the year on the following schemes: *Darjeeling water-supply and sewerage schemes.* As the existing supply of water was apparently insufficient for the sewerage scheme, it was resolved to obtain an additional supply by constructing an impounding reservoir at Senchal, the additional supply of water to be used, not only for drain flushing, but, if found sufficiently pure, for augmenting the supply of drinking water which at certain periods of the year is insufficient for the needs of the town. The total cost of the works, including a ropeway to dispose of refuse, is estimated at

£19,256. Government has sanctioned the scheme and promised £3,333 in addition to the previous grant of £3,333.

Monghyr water-supply.—Tenders for pumping machinery, and for buildings, tanks, mains, filters, etc., aggregating £21,017, have been accepted and the work is proceeding slowly.

Bhagalpur water-supply.—The excavation of the new filter was completed, and the new Diesel oil engine and pump were erected in April, and the transformation of the jet condensers of the old water engines into surface condensers was completed in September.

Howrah drainage scheme.—The drainage of several blocks was almost completed. Block IV was completed.

Puri drainage scheme.—The work made very slow progress, owing to difficulties which it is hoped have now been surmounted.

Barasat, Basirhat, Baruipur and Budge Budge drainage schemes.—Work was commenced but little was done during the year.

Baranagore drainage scheme.—Considerable progress was made.

Bhatpara drainage scheme.—The drains in Block F were completed, and tenders for the construction of the remainder of the scheme at an estimated cost of £8,333 were received.

Arrah drainage scheme.—The construction of the drains was commenced. The total cost is estimated at £14,067.

Numerous other water-supply and drainage schemes occupied the attention of the Board during the year, and it is expected that work on a good many of them will be commenced during the current year.

Eastern Bengal and Assam.

In 1909 the Jorhat union was converted into a municipality and a new union was constituted at Nazira in the Sibsagar district. The total income, including opening balances, of the 45 municipalities, two stations and four unions was £142,046, or nearly £13,333 more than in 1908, and 50·48 per cent (compared with 47·94 per cent of £128,747 in 1908) was spent upon sanitation, including £31,870 on conservancy, £23,283 on water-supply and £4,429 on drainage. The decrease in the expenditure on conservancy, which amounted to about £4,267, was due to the reduction in expenditure under this head at Dacca; while the increase of expenditure on water-supply, amounting to nearly £13,333, was due to the extension of the Dacca water-supply. The increase of £1,825 on drainage was distributed among many towns, but the largest share was taken by English Bazar, where £1,133 was expended on a new drainage scheme.

At Dacca the conservancy tramway was completed and it was formally handed over to the municipality in December 1909. The surface drainage of the new civil station was in progress at the close of the year. Alternative schemes for a combined sewage and drainage system and for separate systems of sewage and drainage were drawn up by the Sanitary Engineer and were under consideration. The remodelling of the water-works was in progress in 1909 and was completed in March 1910. The estimated cost was £35,587. At Chittagong the two six-inch tube wells to which reference was made in last year's report were sunk and the amount of water discharged by them tested. Over 15,000 gallons were obtained from one well and a similar amount will, it is expected, be obtained from the other. Numerous schemes for water-

supply and drainage were under consideration during the year and in a good many cases surveys were carried out. During 1909 sums of £35,615, £18,815 and £13,496 were expended from provincial funds by local and district boards and private individuals, respectively, on sanitary works.

Sanitary Board.

The number of meetings of the Board is not stated in the provincial report. The Board are, however, said to have afforded much useful advice to Government on the numerous schemes of sanitary improvement submitted to it.

United Provinces.

The year 1909 "may," as stated by the provincial Sanitary Commissioner, "be fairly described as one showing considerable sanitary progress." All the water-work stations worked satisfactorily during the year, and the results of chemical and bacteriological examinations showed that the quality of the water supplied was uniformly good. The demand for piped water is increasing and arrangements are being made at Agra, Lucknow and Cawnpore to augment the supply. A feature of the year was the more extensive use of meters which has checked waste and, except in Agra and Mussoorie, led to a decreased consumption of water during the year. The aggregate cost of the estimates of projects for improving the sanitary conditions of municipalities criticized and approved by the Sanitary Board was £104,602, compared with £11,121 in the previous year. The total expenditure incurred on sanitary works under the supervision of the Sanitary Engineer in 1909-10 was £46,182.

Drainage works were sanctioned and work begun at Budaun, Jaunpur, Farrukhabad *cum* Fatehgarh, Agra (supplementary drain and sullage farm), Ujhani, Sardhana, Lucknow (intercepting sewer and Ghasiarimandi and Husainganj scheme), Firozabad and Allahabad (Government Press).

In March 1909 Dr. Gilbert Fowler of Manchester visited the provinces, a result of the visit being a valuable report on the treatment of sullage in the United Provinces.

Sanitary Board.

The Board met six times at Naini Tal and three times at Lucknow. At their meetings they discussed the projects mentioned above, and advised regarding a large number of other schemes on which work has not yet been begun.

Punjab.

The total revenue of the municipal towns during 1909-10, exclusive of the opening balance, was £3,99,321 against £380,053 in 1908-09, of which £195,399, or 49 per cent, was spent upon public health and convenience, including £6,266 capital expenditure and £22,013 recurring charges, on water supplies; £10,106 capital expenditure and £6,610 recurring charges, on drainage; and £52,646 on conservancy, road clearing and watering and latrines.

The total income derived from the sale of manure in municipalities amounted to £10,851 compared with £9,988 in 1908 and £10,598 in 1907.

At Lahore the 12 new wells for the water-works were completed during the year, and the construction of a reservoir on the mound of Ferozepur Road was in progress. Experiments with perforated tube wells were carried out at the water-supply head works and near the female jail and proved fairly successful. Improvements of the drainage were in progress. At Simla the hydro-electric scheme was in progress. At Amritsar the intramural drainage of

several sections of the city was under construction. The Sanitary Engineer reports that the amount of water supplied from the water-works, less than four gallons a head, is inadequate, and that he is awaiting the decision of the Irrigation Department regarding a scheme to generate electrical power from the canal fall before submitting proposals for an increased supply. At Delhi a valuable improvement was effected in the water-supply by the connection of the wells with the suction at the intake whereby clear water can be drawn from the wells when the river is in flood. Proposals for increasing the supply of water have been submitted. The suburban drainage scheme, estimated to cost £28,698, was progressing well. At Multan drainage works of the Town Hall and of the suburb were in progress. At Gujranwala the drainage of the western part of the town was begun. At Ambala, where the fall in the spring level has seriously affected the supply of water, the experiment of sinking a 6-inch tube with 4-inch perforated tubes into one of the supply wells was in hand and promised to be successful. The pumping engines are to be lowered nine feet to reduce the excessive suction lift.

Numerous estimates were scrutinized and approved by the Sanitary Engineer during the year, and the following estimates were sanctioned: revised estimate for a water-supply for the town of Jaranwala in the Chenab Colony, £707; Hazro intramural drainage, £1,080; Gujrat intramural drainage, £2,466; drainage and water-supply of the new market at Pattoki in Chunian Colony, Lahore district, £2,991; Amritsar disposal works, £5,024.

Sanitary Board.

The Inspector-General of Civil Hospitals and two Indian gentlemen were added to the membership of the Board during the year. The post of Sanitary Engineer was held by Mr. H. M. Baines from the 1st January until the 7th July, and by Mr. D. W. Aikman from the 8th July until the end of the year.

The Board met eight times, considered the various schemes of sanitary improvement submitted to them and allotted the sum of £10,000 placed at their disposal by the local Government for distribution as grants-in-aid for sanitary works in 1909-10 to municipalities and district boards.

North-West Frontier Province.

Although no new sanitary work of any magnitude was carried out in this province, a great deal of improvement was effected in the sanitation of Peshawar and Dera Ismail Khan largely owing to the share obtained by these towns of a grant of £3,333 distributed by Government—to Peshawar municipality £1,333, to Peshawar district board £667, to Abbottabad municipality £667, and to Dera Ismail Khan municipality £667.

Central Provinces.

The income of the head-quarters' municipalities, excluding opening balances and certain receipts, was £96,762, of which 46·01 per cent was spent on original and recurring sanitary works, such as water-supply, conservancy, markets and slaughter-houses; 2·87 per cent on plague and ·22 per cent. on vaccination.

The following notes refer to the more important works carried out and in progress during the year. At Nagpur the improvements of the water-works were in progress, the total expenditure up to the end of the year amounting to £6,267. A sum of £3,607 was paid to Mr. Lane-Brown for preparing the survey and plan of the city drainage scheme which is to be gradually

carried out. At Jubbulpore eleven incinerators have been erected for the destruction of night-soil, etc. The municipality applied to Government for a grant of £3,333 to cover the cost of a detailed survey of a combined sewage and drainage scheme. At Harda the extension and completion of the water-supply scheme at an estimated cost of £8,000 was proceeding. At Khandwa £1,597 was spent on the water-supply works including repairs. At Burhanpur the construction of covered galleries over the water channels was undertaken at a cost of £987.

The provisions of the Village Sanitation Act were extended to five more villages. They were not withdrawn from any village.

Sanitary Board.

The Board met at eleven head-quarter towns. The work done under their direction was mainly the improvement of village sites and water-supplies. On February 1, 1910, a separate appointment of Sanitary Commissioner was created, and Captain T. G. N. Stokes, I.M.S., assumed charge of the office.

Madras.

Excluding opening balances the total income of the municipalities in 1909-10 was £354,071 compared with £313,228 in 1908-09. The expenditure during the year on water-supplies, including establishments, was £40,878 compared with £26,154 in the previous year; on drainage, £5,747 against £4,049; on conservancy, including the upkeep of roads, etc., £63,515 against £62,909. The allotment for sanitary purposes made by district boards was £69,074, of which about half was spent in the first nine months of the year.

A special grant of £33,137 from provincial funds was distributed among municipalities and district boards for expenditure on sanitary works such as the opening up of congested areas, town extensions, the formation of lanes for purposes of conservancy and the improvement of water-supplies, for which the local bodies were unable to provide from their own funds.

In commenting upon the every-day sanitation of the municipal towns, the provincial Sanitary Commissioner makes it clear that much inefficiency is due to the lack of skilled supervision, and that even when a sufficient staff of sanitary inspectors and their subordinates is available their energies from mistaken notions of economy are too often absorbed in duties foreign to their legitimate occupation. It is hoped that this state of affairs may be remedied by the issue of orders by the local Government drawing attention to the Sanitary Commissioner's strictures and forbidding the utilisation of these sanitary inspectors as tax-collectors. In order to ensure the continued efficiency of sanitary inspectors arrangements have been made for their attendance every five years at a special course of Hygiene and Minor Sanitary Engineering held at the Madras Medical College. The course of instruction is to be followed by an examination.

At Madras the construction of the new water-supply works was commenced. The masonry work of the new conduit was begun in June 1909, and on the filter beds and pure water reservoirs in January 1910. The plans and estimates amounting to £107,307 for the main drainage of Madras and the local drainage of Tondiarpet were completed. A new scheme for the irrigation of the sewage farm to cost £2,967 was nearly completed.

The construction of the water-works of Berhampur, Bezwada, Salem and Periyakulam, the extension of the water-works at Gudiyattam, improvements

in the water-supply works at Trichinopoly and Madura, the construction of a gallery in connection with the proposed water-works at Tinnevelly and the improvement of the Ootacamund drainage works were being carried out by the Public Works Department during the year. The Sanitary Engineer prepared and submitted to the Sanitary Board or other authorities a large number of plans and estimates for water-supply and drainage schemes.

Sanitary Board.

The Sanitary Board examined during the year 143 sanitary schemes of an estimated aggregate cost of £174,575, of which 35 works, estimated to cost £153,304, were for municipalities and 108, estimated to cost £21,271, were for local fund boards. The most important of these schemes were the water-supply of Vizianagram (estimated cost £32,513), water-supply of Ellore (£21,133), the drainage of Srirangam (£12,440), the drainage of Trichinopoly (£38,991), the water-supply of Chingleput (£9,009), and the water-supply of Palamcottah (£31,547).

Bombay.

In the year ending 31st March 1909 there were, excluding the City of Bombay, 157 municipalities in the Presidency. The total income was £543,441, and £126,716 were spent on the improvement of water-supplies, drainage and conservancy within municipal limits. "Under the stimulus of liberal grants-in-aid from Government," writes the provincial Sanitary Commissioner, "many improvements in water-supply and drainage are being carried out," and it appears that in 33 towns sanitary works of importance are in process of construction or under investigation. The following notes refer to work in progress. At Pandharpur the infiltration wells had been sunk to nearly the full depth; about two-thirds of the main connecting them with the jack well, the rising main and distribution mains have been laid. The pure water tank was completed except the roofing, and the pumping engines were delivered. The expenditure on the water-supply works during the year amounted to £14,933. The drainage work was continued and £533 spent on the collecting drain which is to protect the river frontage from pollution, but progress was delayed by changes in the staff. At Nasik estimates amounting to £23,633 for water-supply were sanctioned and work was begun. At Dharwar the pumping plant and steel mains were delivered and considerable progress was made with the construction of the impounding reservoir, the waste weir, outlet tower and high service reservoir. At Hyderabad the scheme for improving the water-supply, estimated to cost £19,733, was sanctioned and work begun; and work on the drainage scheme was in progress. At Karachi the distribution of the water-supply was extended and sanction has been sought to raise a loan of £54,000 for further extension. The drainage works were continued. At Ahmedabad the two new wells at the head-works of the water-supply were completed; and the drainage system and sewage farm were improved. At Dhulia the filter-beds were completed and handed over to the municipality. At Ratnagiri, pending receipt of formal sanction for the necessary expenditure on water-supply, the commencement of work was authorised, the tunnel was begun and pipes, etc., ordered. Grants-in-aid aggregating £24,467, including £10,000 for the Pandharpur water-supply, were given by Government during the year.

There were 25 district and 212 *taluka* local boards in existence during the year, with a total income of £433,187, of which £27,737 were spent on water-supplies and drainage.

Sanitary Board.

The Board met five times during the year and among other matters considered proposals for improvement of the water-supplies of Ahmednagar, Alibag, Bijapur, Broach, Bulsar, Godhra, Hubli and Sholapur, and of the drainage of the Vaccine Depôt at Belgaum and the police lines at Bhamburda. During the year an experimental boring at Sanand resulted in finding a sub-artesian supply of water at a depth of 300 feet and it is hoped that this discovery may solve the problem of providing sources of pure water in Guzerat. Another interesting experiment was the successful tracing by means of an electrical apparatus of an underground stream of water. It is hoped that this will lead to the location of sources of water-supply in the trap formation.

The staff of the Sanitary Engineer was augmented during the year to enable him to cope with the increasing work of the department.

Burma.

Excluding Shwebo the total income of the districts and of municipal towns was £1,038,153 and the total expenditure £315,679, of which £107,994 were spent on water-supplies, £87,459 on conservancy, £41,047 on drainage and £79,179 on other sanitary works. The amount of new work of importance carried out during the year appears to have been limited, but several surveys and projects were drawn up and a few schemes were examined and reports upon them prepared.

Sanitary Board.

The Sanitary Board met twice during the year and considered the amended scheme for the water-supply of Bassein, the water-supply scheme for Minbu, the amended estimates for the Kyaiklat water-supply and conservancy schemes, the amended estimates of the Minbu water-supply scheme, the amended estimate of the Thayetmyo water-supply scheme, and proposals for laying out of railway towns.

General Remarks.

Red Sea Pilgrim Traffic.

Since the autumn of 1906 no change has been made in the orders under which pilgrimage to the Hedjaz is permitted. For the season 1908-09, the pilgrims embarked at Bombay, as usual, the ships by which they proceeded being thoroughly cleansed and freed from rats by the Clayton process under the personal direction of the Port Health Officer. The pilgrims were medically inspected and their clothing and bedding thoroughly disinfected previous to embarkation. In all 16,097 pilgrims left Bombay in 21 ships, the first ship sailing on the 7th September and the last on the 7th December 1908. The British Vice-Consul at Camaran notes that 15,985 pilgrims arrived in the 21 ships from Bombay. The observation station at Perim was open during the pilgrim season and all the pilgrim ships were inspected there before proceeding to Camaran. Diarrhœa appeared among the crew of the pilgrim ship "Alavi" at Camaran on the 27th November 1908, that is three days after the arrival of the vessel, and according to the report of the Vice-Consul, Camaran, a diagnosis of cholera was subsequently established in three cases. All the cases occurred among the crew and only one proved fatal. The origin of the outbreak was not traced but was suspected to be due to the inordinate consumption of fish. During the period of detention at Camaran the deaths of 171 pilgrims were registered at the Central Hospital of the quarantine station of which 114 were of pilgrims from India. The principal causes of death were malarial fevers, senile debility, pneumonia and dysentery.

The accommodation for pilgrims in the segregation camps at Camaran is again said to have been almost inadequate, while the period of quarantine for Indian pilgrims remains at eight days compared with three days for other pilgrims from the east.

The Haj report mentions that the Hedjaz remained free from cholera during the season, but small-pox was epidemic from October 1908. A suspected case of plague was discovered at Jeddah on the 16th December and the presence of the disease was confirmed on the 4th January 1909. The source of infection could not be traced. The general sanitary condition of Jeddah, Mecca, Mina and Araft during the season is said to have been extremely bad. The Vice-Consul records that no improvement has been made in the hospital accommodation at Jeddah and Mecca. A fund was opened for the construction of a new hospital at Jeddah, and although subscriptions exceeding £500 were received, nothing beyond the erection of a wooden shed has yet been done. Return fares to India were, owing to competition, very low, but at the end of the season it was necessary to repatriate about 500 destitute Indian pilgrims at a cost of £70 which was met from the "Jubilee Indian Pilgrim Relief Fund."

The Indian pilgrims returned in 24 ships which brought in all 14,330 pilgrims. During the homeward voyage there were a total of 279 deaths on 19 ships, due chiefly to old age, general debility, small-pox, dysentery, diarrhœa and privation. The Port Health Officer calculates that the death rate for the homeward voyage is no less than about 507·5 per thousand per annum and this compared with the comparatively small death rate on the outward voyage shows that the pilgrims undergo much hardship and privation while visiting the holy

cities. A case of plague occurred on one of the 24 homeward bound ships and 99 cases of small-pox were distributed among 14 of the ships. The plague patient was landed at Bombay and sent to hospital, while of the patients suffering from small-pox 20 died during the voyage, and 19 were landed at intermediate ports and the remainder at Bombay where they were sent to hospital. Vaccination was offered to the pilgrims among whom small-pox occurred, but the majority refused it. After persuasion and example, 3,729 pilgrims and 84 sailors were vaccinated. The small-pox infected ships were thoroughly fumigated, and the clothing and bedding of 9,849 pilgrims among whom small-pox appeared were disinfected before the pilgrims were handed over to the Protector of Pilgrims for despatch to their homes. The effects of 1,052 members of the crew of the infected ships were also disinfected.

Laboratories.

The staff of the *Central Research Institute*, Kasauli, conducted investigations during the year into (*a*) dysentery at Bombay, (*b*) some aspects of malaria in the Punjab, (*c*) the relation of hypodermic and intramuscular injections of quinine to tetanus, and (*d*) a new method of anti-rabic treatment by means of dead rabies virus. Reports of the results of the investigations are under preparation. In November 1909 an enquiry into epidemic dropsy in Calcutta was commenced, and is in progress.

Short courses of instruction in clinical bacteriology and technique were given at the Institute throughout the year and were attended by 32 officers of the Indian Medical Service. The course includes instruction in the practical application of bacteriological knowledge to the conditions in which diseases are met with in India, and methods of improvising small laboratories for clinical bacteriological work on the plains.

The demand for curative sera and vaccines continued to increase, and during the year the Institute complied with indents to the following extent—

Anti-venomous serum	3,580	doses.
Anti-diphtheritic serum	1,191	„
Anti-tetanic serum	1,200	„
Anti-streptococcus serum	173	„
Anti-typhoid vaccine	1,500	„
Anti-tubercle vaccine	2,245	„
Anti-staphylococcus vaccine	199	„
Acne vaccine	48	„

Of the above, anti-tetanic and anti-streptococcus sera are obtained from England and stocked for issue. The total sum realized on account of the sera and vaccines issued from the Institute during the year amounted to £975. In addition the Institute now prepares a polyvalent curative dysentery serum which is available for issue on demand.

The other work carried out by the Institute included the preparation of a vaccine for each of 50 special cases of bacterial infections; the examination of 1,850 specimens of a miscellaneous collection of pathogenic material with a diagnosis in each case; the examination of 35 tumours, a diagnosis being given for each after cutting and staining sections. In addition in about 100 instances written instructions and advice were given on subjects connected with infectious diseases, vaccine therapy, etc., to medical officers in the country.

The Bombay Bacteriological Laboratory continued to be conducted as (*a*) the Plague Laboratory for the whole of India, and (*b*) the provincial Bacterio-

logical Laboratory. During the year, 593,164 doses of anti-plague vaccine were issued, an increase of 59,849 doses on the number issued in the previous year. The increase is evidence of growing confidence in this method of combating plague. The surest proof of the efficacy of the anti-plague vaccine is the continued immunity of the staff employed at the Laboratory where experiments are constantly being made in which hundreds of plague infected fleas are used, and where it is the constant duty of the staff to handle rats from which it is easy to collect large numbers of fleas, some of which must be plague infected. Yet the staff, numbering 111 persons, who are regularly inoculated every year, escape infection. In connection with the mitigation of plague, the failure of the Clayton gas apparatus and Leybold's apparatus to rid Indian huts of rats and fleas, led to the institution of experiments with hydrocyanic gas. It was found that the gas is very fatal to insects, flea eggs and larvæ, but that it has no lethal action on the plague germ. The experiments were directed to (*a*) the disinfection of clothing and (*b*) the disinfection of plague infected houses. As to the first, if a specially constructed godown is used, it is possible to deliver clothes free from fleas in 30 minutes, and there is no damage to fabrics. In regard to houses, small rooms can be cleared of rats and fleas in an hour, but the danger from the diffusion of the gas is too great to permit of its use in crowded localities and city tenements. The application of the gas is possible to isolated huts only or to villages totally evacuated, and moist food stuffs would require to be removed during fumigation as they are said to absorb the poison: on the other hand dry grains remain unaffected. Experiments were also conducted with Napthaline and Acorus calamus as insecticides: the former is a powerful pulicide but slow in its action, while the latter is not sufficiently powerful to be of practical use for removing fleas from clothes.

As in previous years the Laboratory made *post mortem* examinations of rats found dead or caught within the bounds of the municipality. During the year 91,540 rats were examined and 9,600 found to be plague infected, against 110,512 and 13,489, respectively, in the previous year. Practical instruction in the examination of rats and the diagnosis of plague in them was afforded to a considerable number of medical men. Many were also shown the methods employed for the manufacture of anti-plague vaccine, and others instructed in the technique of inoculation work.

There was an increase in the work done by the Laboratory as the provincial institution; 919 pathological fluids and discharges, 38 specimens of urine, 211 new growths and other tissues and the brains of 38 animals dying of symptoms suspicious of rabies were examined. During the year 47 snakes were received for the extraction of venom, and experiments were carried out to test the value of a Mexican remedy "Ofidina," an alleged antidote for the bites of all poisonous snakes, which however was proved to be useless. An officer of the Laboratory was deputed to investigate cerebro-spinal meningitis in the prison at Hyderabad (Sind) and prepared a report on the subject. Assistance and advice were afforded by the examination of 112 animals sent for identification or as to the cause of death, and by the examination of samples of disinfectants. A large amount of work was done in connection with vaccine-therapy. Two hospitals in Bombay were visited twice a week by the Director to examine and treat cases suitable for such treatment. Besides stock vaccines of various kinds, 72 autogenous vaccines for special cases were prepared. Bacteriological equipment and material were supplied to medical officers in all

parts of India. Certain descriptions of sera continued to be stored for sale on behalf of the Lister Institute. Two courses of instruction for Sub-Assistant Surgeons were held with good results.

The report of the Micro-biological section of the *King Institute of Preventive Medicine*, Madras, for 1909, is for the nine months ending 31st December as the first quarter of the year was covered in the preceding report. In the period under review the systematic examination of the water-supplies of the Presidency was continued, each supply being examined once a quarter. In addition the systematic examination of water-supplies of the jails in the Presidency was commenced and it was arranged that each should be examined half-yearly. This work has constituted the bulk of the routine work of the Institute. The Assistant Director, Captain Patton, I.M.S., returned from leave in August 1909, and the appointment of Deputy Superintendent, held by a Military Assistant Surgeon, was then abolished. In addition to his routine work in the Vaccine Section of the Institute, Captain Patton was actively engaged on protozoological work. In respect of vaccine-therapy a few encouraging results were obtained by the use of vaccines prepared from organisms derived from patients, but the development of this work is not possible with the present staff of the Institute. The amount of pathological and other material sent for examination continued to increase, and during the nine months under report, 2,444 specimens were received. Of the total 2,425 were examined, but in a considerable number of instances the specimens were unsuitable, the majority being of rats in so decomposed a condition as to render it impossible to say whether they were plague infected or not. In 19 instances the material sent was either too little, too much or unsuitable. Courses of instruction in Minor Sanitary Engineering and in Vaccination were, as usual, held for students of whom 44 attended the former and 28 the latter.

The work of the Vaccine Section of the Institute has been referred to in Section VII of this report.

At the *Pasteur Institute*, Kasauli, there was a large increase in the number of persons afforded anti-rabic treatment during 1909. Of the total of 2,062 persons who came for treatment, in the case of 125 it was not considered necessary for them to undergo the course. There was, therefore, a total of 1,937 persons who underwent a complete course of treatment, compared with 1,389 persons during the previous year. Patients came from all provinces, except Madras from where they now proceed to the Institute at Coonoor. Of the total, 500 were Europeans and 1,437 Natives, compared with 342 and 1,047, respectively, in the preceding year. There were 24 deaths from hydrophobia among those treated, giving a mortality of 1·2 per cent, but excluding those who died during treatment or within 15 days of its completion, the number of failures falls to 11 only, giving a ratio of 0·57 per cent, against the general average of 0·67 per cent for the Institute. Further modifications have been made, in the light of experience, in the treatment carried out at the Institute.

In regard to the work of the Institute as the provincial Bacteriological Laboratory for the Punjab, the Director remarks that Civil Surgeons in the province do not appear to have yet realized that a laboratory exists for furnishing reports on pathological material on which an opinion is desired. At the same time examinations were made in 1,716 cases, and in addition an investigation was

carried out into the poisonous characteristics of *ak* juice (madar) with special reference to the minimum lethal doses for animals. The laboratory was used by Major Perry, I.M.S., Deputy Sanitary Commissioner, Punjab, for work connected with investigations into malaria, and by Captain Forster, Professor of Pathology, Lahore Medical College, in connection with the vaccino-therapy and etiology of dysentery.

At *the Southern India Pasteur Institute*, Coonoor, 658 persons were afforded anti-rabic treatment during the year ending 28th February 1910, compared with 340 persons during the previous year. Of the total 175 were Europeans and 483 Natives. All the patients came from Southern India, with the exception of two from Bengal and 39 from Burma. During the year, no patient died during treatment, but two against one the previous year died in less than 15 days after completion of the course, and one against one, more than 15 days after. The percentage of failure was ·15 in 1909-10, against ·29 in the previous year if the deaths which occurred within 15 days are omitted, and ·45 and ·58, respectively, if they are included.

Investigations were carried out in connection with the different appearances of Negri bodies under varied conditions, and into the problem of immunity in general as illustrated by hæmolytic methods. Sections of 653 pieces of material were cut and examined.

Plague.—The Plague Research Commission continued their investigations into the etiology of plague, their headquarters being at the Bombay Bacteriological Laboratory. Work on the experimental production of plague epizootics among *Mus. rattus* was carried out and the progress of the epizootic in the godowns at different periods, observed. The laboratory staff assisted in the examination of a large number of rats in connection with the systematic study of 'resolving' plague, and the Commission investigated all rats showing signs of resolving plague and obtained information as to the infectivity of the lesions found. Experiments in breeding from *Mus. rattus* from wild stock were instituted and several litters successfully reared, important facts regarding the fecundity, breeding habits, rate of growth, etc., of these rats being obtained. The treatment of plague cases with Yersin's serum was continued, and information as to its value will be published in due course. The results of the work of the Commission are periodically published by the Advisory Committee for Plague Investigation in India. A summary of the chief conclusions arrived at by the Advisory Committee as the result of the investigations made under their direction from 1905 to 1909 into the mode of the spread of plague in India will be found in paragraph 96, Section VI, of this Report.

Special enquiries.

Dysentery.—A report on the enquiry which is being conducted by officers of the Central Research Institute is in the Press for publication as a Scientific Memoir, and a further report will appear after the conclusion of the enquiry.

Jail Dietaries.—Captain McCay, I.M.S., has completed his investigation. The first report on the subject was published as No. 37 of the Scientific Memoirs, and a second report is now in the Press for publication.

Malaria.—In August 1909 the Government of India addressed the several local Governments and Administrations on the subject of a proposal by the Sanitary Commissioner with the Government of India that a permanent organisation should be formed to enquire systematically into problems, both practical and scientific, connected with malaria in India. They pointed out that because

it is essential that the people of this country should be persuaded to adopt the measures that may be most suitable to the areas in which they live, any scheme for an organised attempt to deal with the malaria problem throughout India must be framed in consultation with administrative officers intimately acquainted with local conditions in the various provinces; and they stated that for this reason the Governor-General in Council had decided to convene a conference to examine the question and to draw up a plan of campaign for the consideration of the Government of India and local Governments. The attendance of certain selected officers was arranged by the Government of India and administrative officers of experience, medical officers, and Indian gentlemen were delegated to the conference by local Governments and Administrations. The conference was opened at Simla by His Excellency the Viceroy and Governor-General on the 12th of October 1909 and meetings were held daily until the 18th. The resolutions and recommendations passed by the conference were published in the last issue of this Report and the printed copies of the complete proceedings were widely circulated in February 1910.

The nature of the proposed organisation for dealing with malaria in India was outlined at the conference by the Sanitary Commissioner thus :

I.—A committee in each province of three or four members personally interested in the malaria problem, enjoying the confidence of the local Government and prepared to obtain information and supervise local enquiries. They should, perhaps, control the agency for the distribution of quinine. One of their first duties would be (in association with the provincial Sanitary Department) to ascertain the real causes of death in different localities, and to set in motion an enquiry in each district regarding the relation of the fever season to the drainage and rainfall.

II.—Every autumn each provincial committee would delegate, under the orders of the local Government, one of their members to attend a meeting of a General Committee in Simla. This General Committee would consist of the provincial delegates, the Sanitary Commissioner representing the Government of India, with Major James as Secretary.

III.—The Government of India would appoint a Central Scientific Committee consisting of Lieutenant-Colonel Semple, Major James (Secretary), Captain Christophers, and the Sanitary Commissioner, with power to add to their numbers.

A certain number of workers would be entertained under the Central Scientific Committee, and, when necessary, workers might be deputed to serve under the provincial committees. Such workers during the time of their deputation would, of course, be under the control of the local committee ; but, in order that the purpose of the whole organisation should not be defeated, relations of mutual confidence would exist between the central and local committees, and there would be full interchange of views, not only on the occasions of the annual meeting, but by means of correspondence at all times.

The Conference strongly supported the establishment of this organisation, and, on the 2nd of February 1910, the Government of India, in circulating the report of the proceedings, addressed the local Governments and Administrations with reference to it and to the other resolutions and recommendations passed. In this letter the Government of India agreed with the conference as to the need for detailed investigation of the epidemiology and endemiology

of malaria in India and approved the organisation that the Sanitary Commissioner had outlined. They hoped that the several local Governments and Administrations would co-operate with them by establishing provincial organisations to work in consultation with the Central Scientific Committee and from which delegates would be selected to meet annually as a General Committee. They invited special attention to the importance of carrying out the statistical enquiries recommended by the conference, and requested that orders might be issued for the initiation of these enquiries with a view to the preparation of malarial surveys of the different provinces. They specified nine subjects upon which information should be collected. They pointed out that while many of the suggested investigations could be carried out by the existing staff in the provinces, some of them demand expert knowledge, and for this reason they proposed that a class consisting of one medical officer and one medical subordinate from each province should assemble at a malarious place in the Punjab to be instructed by Captain Christophers. Finally, they defined under the following headings the work that would be done by the Central Scientific Committee:

A.—*Routine work.*—(1) An investigation of the distribution in India of the different species of anopheles. A type collection will be formed and arrangements will be made for the identification of specimens sent by collectors. Instructions regarding the method of making collections will be issued. (2) Biological facts regarding the different species of anopheles will be collated from the reports of provincial workers and others. (3) The comparative prevalence of the different varieties of the malaria parasite will be ascertained and a critical examination of blood specimens will be carried out systematically. (4) When sufficient information regarding any subject of inquiry is accumulated a bulletin for general information will be issued.

B.—*Work in the field and laboratory.*—The investigation will be commenced of such questions as the following:—(1) The reason for exemption from malaria of certain tracts in which conditions are apparently favourable to it. (2) The conditions leading to the presence of intense malaria in certain areas. (3) The conditions determining epidemic prevalence. (4) The transmission of malaria (*a*) A study of the bionomics of anopheles. (*b*) The effect of multiple inoculations of parasites by a study of culex and proteosoma, etc. (*c*) The production of gametes in different conditions—(*i*) The relation of production to single attacks, to relapses and to the state of constant infestation occurring in children in endemic areas. (*ii*) The effects of scarcity, temperature, and other conditions. (5) The cause of the resistance to the action of quinine of certain cases of malaria and the action of the drug on the parasite in—(*a*) simple cases and relapses, (*b*) multiple infections and infestations, (*c*) cases of long continued malarial infection and enlarged spleen. (6) The causes of hæmolysis *in vivo*, the production of anti-bodies and the intimate pathology of malaria. (7) Conditions unfavourable to the life of the larvæ of anopheles, including a study of the action of different kinds of fish. (8) A study of the epidemiology of *kala-azar* and of other conditions of splenomegaly not apparently associated with the parasites of either malaria or *kala-azar*. (9) The action of quinine; the effect of the quinine treatment of man in preventing the infection of mosquitoes; the effect of large doses of quinine on the production of gametes, etc.

Amritsar in the Punjab was chosen as a very suitable place in which to hold the class of instruction referred to in the above letter, and for the purposes of a laboratory a house was secured there. The course of instruction lasted from the 15th of March to the 30th April 1910 and was attended by medical officers and medical subordinates from all the larger provinces. The arrangements made by Captain Christophers were excellent and in view of the desirability of repeating the course from time to time and of possessing a permanent laboratory in a malarious locality, the Sanitary Commissioner recommended to the Government of India that the house should be taken on a three years' lease. This was sanctioned and the laboratory now forms a permanent home for investigation and teaching in connection with malaria. At a second class held from the 15th October to the 26th of November 1910 accommodation was provided for a few sanitary officers from the army and from municipalities.

The Central Committee held their first meeting on the 12th May 1910 and the present position of the work assigned to them may be summarized as follows: (1) A Central Malaria Bureau has been opened at "Sunnybank," Kasauli. (2) A laboratory has been established at Amritsar. (3) The first number of PALUDISM, which is a periodical containing accounts of the work accomplished in India and of such work done elsewhere as will be helpful to Indian investigators, was published in July 1910; in the same month a pamphlet of instructions to collectors of specimens for the Central Malaria Bureau was widely circulated. (4) The most urgent subjects for investigation by workers appointed at the instance of the Central Committee are considered to be, (*a*) a continuation of the enquiry into epidemic malaria, (*b*) an enquiry into endemic malaria, (*c*) an enquiry into the bionomics of *anopheles*, (*d*) enquiries into the action and use of quinine. In regard to the first of these Captain Christophers has completed his enquiry into the causation of epidemic malaria in the Punjab and his report is now in the Press for publication as one of the Scientific Memoirs. For the second and third investigations further assistance is required, but in the meantime the Government of India have sanctioned the deputation of Major Perry, I.M.S., who has been thoroughly trained at the Amritsar and Kasauli laboratories. The lines on which the Committee consider that the fourth subject of enquiry should be conducted were published in the first number of PALUDISM. It is hoped to get a part of the investigations done in prisons and to that end several Inspectors-General of Prisons are co-operating. Meanwhile Lieutenant-Colonel Semple has completed an enquiry into the relation of quinine and tetanus and Captain MacGilchrist, I.M.S., has completed an enquiry in connection with the action and therapeutics of quinine. The reports of both these investigations will be published shortly as Scientific Memoirs.

The first meeting of the General Committee was held at Simla under the Presidency of the Sanitary Commissioner with the Government of India on the 3rd and two following days of November 1910. It was attended by the members of the Central Committee and by a delegate from each province. The principal subjects discussed were the administrative arrangements that have been and are being made for the investigation of malaria in India generally and in the different provinces, the scientific results that have been obtained since the Imperial Malaria Conference, and the programme of future work. The report of the meeting will be published in the next number of PALUDISM, which it is hoped to issue shortly.

The report by the Committee appointed in October 1909 by the Government of India at the instance of the Secretary of State to enquire into the measures taken against malaria in the Lahore (Mian Mir) Cantonment has been published and distributed.

Kala-azar and Oriental Sore.—In the issue of this report for 1906, attention was directed to the discovery made by Captain Patton, I.M.S., that the parasite of kala-azar may sometimes undergo development in the body of a species of bed-bug. Since then Dr. Nicolle, of the Pasteur Institute at Tunis, has made the very important discovery that parasites morphologically resembling those of kala-azar are not infrequently present in dogs; but as regards finding the transmitter of the disease Captain Patton's observation still represents the furthest stage that has been reached. Recently it has been realized that the problem might, perhaps, be solved by a study of the mode of spread of oriental sore, and attention has therefore been directed to that disease. The successful transmission of oriental sore to dogs or to monkeys by direct inoculation has recently been reported by Nicolle and Manceaux, Row, and others, and it has therefore been held by some that a biting and blood-sucking intermediary is not essential; but the more general view is that the usual carrier is an insect or arachnid with those characters, and the possible role of "sand flies" (*Phlebotomus papatasi*), mosquitoes, lice, and bugs has received attention. In June 1910 Captain Patton was placed on special duty to attempt to solve the problem and he selected Cambay in the Bombay Presidency as a suitable place for the enquiry. Neumann had already reported that at certain periods during the course of oriental sore the parasites are present in the circulating blood, and early in his investigation Captain Patton found that from time to time the sores become puffy and swollen at their margins as a result of a very active multiplication of the parasites and invasion of the cells. During one of these periods he found parasites in smears of peripheral blood taken a "considerable distance" from the sore, an observation which, in his view, suggests that when the sores become puffy and swollen numbers of parasites are discharged into the circulating blood. Captain Patton's experiments to find the natural transmitter of the disease were carried out with house flies, mosquitoes (genus *Stegomyia*), head and body lice, and bed-bugs (*Cimex rotundatus*). He reports that except those with the bed-bugs all his experiments gave negative results. The experiments with the bed-bugs were carried out to ascertain (1) if the parasites reach the stomach of the bug, and (2) if the parasites undergo development and "flagellation" there. During June, July and August about 250 bred specimens of *Cimex rotundatus* were fed "on the surface blood" of two patients and dissected at suitable intervals. It was proved that some of the bugs had ingested parasites, but for a long time no evidence that the parasites undergo development was obtained. Captain Patton then directed his attention to the observation that in Cambay nearly 95 per cent of all patients become infected during the cold season, and he therefore decided to imitate the cold weather conditions by keeping the fed bugs in tubes surrounded by ice. These new experiments were begun on July 25th, and on August 8th the stomach of one out of eleven nymphs was found to contain about 20 pairs of long flagellates actively motile and dividing. Now that the cold season in Cambay has begun a greater number of experiments based on this suggestive finding are in progress.

Epidemic dropsy and beri-beri.—In December 1909 Captain E. D. W. Greig, I.M.S., commenced an enquiry into an outbreak of "epidemic

dropsy or beri-beri" that had occurred in Calcutta. His report has not yet been published, but the importance of the subject justifies a brief account of the preliminary results. In the first place it is important to note Captain Greig's definite statement that the signs and symptoms of the disease which he investigated differ considerably from the signs and symptoms of beri-beri as observed among Chinese patients; evidently Captain Greig is of opinion that the disease in Calcutta was correctly termed epidemic dropsy and that epidemic dropsy is a disease distinct from the beri-beri of Chinamen in Calcutta. He considers, however, that it closely resembles the disease called "ship beri-beri" as defined by Holst, Nocht, and a committee held in Norway in 1902; and, as in that type of beri-beri, scorbutic symptoms are frequently present. In the second place, as regards the etiology of epidemic dropsy, Captain Greig found (1) that it is not infectious, (2) that no germ which might be suspected as the cause could be found in the blood or excreta of patients, (3) that in all probability the disease is due to defective nutrition resulting from the use of a diet which, owing to a deficiency in certain constituents essential for physiological requirements, is "one sided" in character, (4) that the absence of a proper amount of those essential constituents from the diet of Indian communities, and consequently the "one sidedness" of the dietary, may arise in a variety of circumstances and that it occurs, for example, when the price of food grains remains at an unusually high level for a considerable period, (5) that in the particular outbreak which he investigated, the absence of a proper amount of the essential constituents of the diet arose from the use, as the staple food, of a kind of rice or of wheat from which, during the process of milling, the outer layers of the grain had been removed, (6) the essential constituents are present in the outer layers of the grain and the chemical researches carried out by Mr. Hooper showed that phosphorus was markedly deficient in the steam milled rice and wheat as compared with the amount in rice and wheat prepared by hand.

Some of these interesting results were obtained by investigating the distribution of the disease in Calcutta. A community of Indian merchants, Marwaris, living in the centre of the affected area in Calcutta did not record any fatal case of epidemic dropsy, whilst Bengalis living in the same wards were dying from the disease: further it was observed that the better class European community in Calcutta did not contract the disease. These three communities were living in similar climatic and other environmental conditions, but they differed markedly from one another in respect of dietary. These findings led to a careful experimental and chemical study of the diets of the Bengalis and Marwaris, and the results of the chemical analyses showed that the Bengali diet was much poorer than the Marwari diet in certain essential constituents, particularly in phosphoric anhydride. The rice used by the Bengalis had undergone a process of "polishing" by which the layers containing the phosphorus, fat, and nitrogen had been removed; and similarly the wheat flour used by that community had been so finely sifted that it was very poor in those essential constituents.

According to Captain Greig, therefore, the habitual consumption, as the staple food, of steam milled rice and wheat ("polished" rice and finely sifted flour) were the cause of the outbreak of epidemic dropsy in Calcutta, and he considers that the disease can be prevented (1) by using "unpolished" food grains, or (2) by adding rice and wheat bran (the "polishings") to the diet,

or (3) by substituting for a portion of the steam milled grains a sufficient quantity of other grains, such as *mung dhal*, which are rich in the requisite constituents, *or a sufficient quantity of fresh meat.*

From the scientific point of view another aspect of the subject is important. It will be noted that although Captain Greig regards epidemic dropsy as a disease distinct from beri-beri, his view of its causation is identical with a view of the causation of beri-beri that has recently been accepted as correct by a number of observers. This apparently contradictory result is perhaps due to the confusion that exists in regard to the diseases which the word "beri-beri" connotes. During recent years writers on beri-beri have made it appear that the word connotes only one disease, but doubtless the correct view is that it connotes several diseases, and that we should speak, not of "beri-beri," but of "the beri-beris," just as we speak correctly, not of "dysentery," but of "the dysenteries." The source of the word "beri-beri" is not definitely known, but according to Aitken it was "the name given by the Malabar physicians to almost every fatal form of debility—paralysis of various kinds, reflex paraplegia, dropsy, anasarca, cachexia, scurvy, and anæmic rheumatism, with various diseases of the heart and pericardium." If we accept this statement as being correct we can easily understand why later writers, who desired to regard the word as connoting only one disease, have described so many "forms" of beri-beri, and why so many different causes have been assigned,—in all probability the "forms" are different diseases and the causes are the causes of those separate morbid states. If the descriptions of the different beri-beris of which the causation is now known were re-written, it would be possible to ascertain whether the etiology of all the beri-beris has been discovered.

Scientific Publications.

Since the issue of the last report, two numbers of the Scientific Memoirs have been published, No. 37, *Investigations on Bengal Jail Dietaries, etc.*, by Captain D. McCay, I.M.S., and No. 38, *Preliminary Report on the killing of Rats and Rat Fleas by Hydrocyanic Acid Gas*, by Captain W. D. H. Stevenson, I.M.S. Several papers are in the Press for publication. The first number of *Paludism*, being the Transactions of the Committee for the Study of Malaria in India, referred to in paragraph 153—*Malaria*—above, was issued in July 1910 and copies circulated widely. A pamphlet of instructions to collectors of specimens for the Central Malaria Bureau was drawn up by the Committee and copies distributed to those likely to find them useful.

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Sanitary Commissioner with the Government of India.

Statistical Tables, 1909.

Table No.				Page.
I.—	European Troops.—	Summary.—	A.—Sickness and Mortality by Armies and Divisions.	133
			B.—Sickness by Geographical Groups ...	„
II.—	„	„	Ratio of Armies	134
III.—	„	„	„ „ Geographical Groups	135
*IV.—	„	„	Strength, admissions, &c., from all causes and from Enteric Fever, by Age and Length of Residence.	...
V.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	136
VI.—	„	„	Arrivals, Age and Length of Residence in relation to Venereal Disease and Enteric Fever.	„
*VII.—	„	„	Relation of Mortality to Age and Length of Residence ...	...
*VIII.—	„	„	Relation of Invaliding to Age and Length of Residence ...	...
IX.—	„	„	Statistics of Officers.—A.—Sickness and Mortality among Officers of British Army.	137
			B.—Causes of Death among European Officers of Indian Army.	„
X.—	Native Troops.—	Summary.—	A.—Sickness and Mortality by Armies and Divisons.	138
			B.—Sickness by Geographical Groups ...	„
XI.—	„	„	Ratios of Armies	139
XII.—	„	„	„ „ Geographical Groups	140
XIII.—	„	„	Sickness and Mortality in Plains and Hills	141
XIV.—	Prisoners.—	Summary.—	A.—Sickness and Mortality by Administrations ...	142
			B.—Sickness and Mortality by Geographical Groups	„
XV.—	„	Ratios of Administrations		143
XVI.—	„	„	„ Geographical Groups...	144
XVII.—	General Population.—	Provincial Birth and Death Statistics		145
XVIII.—	„	„	Births	„
XIX.—	„	„	Deaths...	146
XX.—	„	„	„ in Towns and Rural Circles	„
XXI.—	„	„	„ according to Age	147
XXII.—	„	„	„ „ „ Cause	„
XXIII.—	„	„	„ by months	148
XXIV.—	„	„	Ratio of Deaths according to months	„
XXV.—	„	„	Deaths from Cholera, by Provinces, 1889-1909 ...	149
XXVI.—	„	„	Deaths from Cholera, by months, in 1909 ...	150
XXVII.—	„	„	Details of distribution and occurrence of Cholera in 1909.	„
XXVIII.—	„	„	mortality from Small-pox	151
XXIX.—	„	„	„ „ Fever	152
XXX.—	„	„	„ Dysentery and Diarrhœa... ...	153
XXXI.—	„	„	„ „ Plague	154
XXXII.—	„	„	„ „ Respiratory Diseases	155
XXXIII.—	„	„	Vaccination	156

* Under the orders of the War Office these tables are no longer compiled for India.

European Troops.

Table I.—Summary, Sickness and Mortality.

A—Armies and Divisions.	Years.	Average strength.	Ratio per mille of strength.											
			Admissions into hospital.	Constantly sick.	Deaths.	Invaliding.	Deaths from Cholera.	Small-pox.	Enteric Fever.	Heat-stroke.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.
Northern Army	1908	36,676	939	49	10·72	16	·76	·03	3·22	·79	·33	·46	·41	·87
	1909	37,995	775	43	6·97	10	...	·03	2·11	·29	·16	·32	·34	·61
Southern Army	1908	30,243	724	44	7·51	16	·23	·03	3·28	·26	·13	·33	·46	·76
	1909	31,425	661	40	5·66	9	·23	...	1·05	·13	·10	·32	·16	·35
1st (Peshawar) Division	1908	3,018	1,431	61	18·89	15	2·98	...	7·29	2·32	·66	·33	...	1·33
	1909	3,235	1,057	47	11·13	21	...	...	3·71	·93	...	...	...	·62
2nd (Rawalpindi) ,, ...	1908	6,909	827	48	13·32	21	·87	...	4·63	·43	·58	·43	·29	·87
	1909	7,404	657	35	5·27	9	...	...	1·22	...	·14	·27	·41	·41
3rd (Lahore) ,, ...	1908	8,572	881	50	7·70	11	·35	...	1·75	·70	·47	·35	·58	1·05
	1909	8,979	767	47	6·13	10	...	...	1·00	·56	·11	·67	·56	·56
4th (Quetta) ,, ...	1908	4,003	610	33	5·75	18	·25	...	1·50	·25	·25	·50	...	·50
	1909	4,468	535	34	5·37	11	...	...	·45	...	...	·45	...	·45
5th (Mhow) ,, ...	1908	6,730	809	43	9·06	19	...	·15	3·12	·74	·15	·30	·74	·59
	1909	7,095	806	40	4·51	9	...	...	1·13	...	...	·14	·28	·28
6th (Poona) ,, ...	1908	6,534	643	41	7·04	11	...	...	1·99	...	·15	·61	·15	1·07
	1909	6,607	556	35	6·36	5	·45	...	1·82	...	·15	·81	...	·30
7th (Meerut) ,, ...	1908	8,656	1,114	53	8·90	16	...	...	2·77	·23	·12	·58	·35	·69
	1909	9,017	875	46	7·32	8	...	...	2·77	·22	·33	·22	·44	·55
8th (Lucknow) ,, ...	1908	9,521	723	42	10·61	17	1·05	·11	2·63	1·16	·21	·53	·53	·74
	1909	9,367	682	41	7·37	10	...	·11	2·67	·11	·11	·21	·11	·85
9th (Secunderabad) Division ...	1908	8,143	706	51	7·49	16	·25	...	2·70	·25	...	·12	·37	·86
	1909	8,002	552	45	5·87	9	·37	...	1·37	·12	·12	·25	·12	·37
Burma Division...	1908	3,733	745	51	8·30	17	1·07	...	1·88	...	·27	·27	·80	·54
	1909	4,133	772	41	5·81	5	·24	...	...	·24	·24	·24	·24	·48
Aden Brigade	1908	1,100	629	41	4·55	26	...	...	...	...	...	...	1·82	·91
	1909	1,120	1,014	54	8·04	26	...	...	...	1·79	...	...	·89	...
INDIA	1908	68,933	840	46	9·18	16	1·10	·03	2·76	·54	·23	·39	·42	·80
	1909	71,556	717	40	6·25	9	·16	·01	1·58	·21	·13	·31	·25	·48

B—Groups.	Years.	Average strength.*	Ratio per mille of strength.											
			Admissions.	Constantly sick.	Admissions from Influenza.	Cholera.	Small-pox.	Enteric Fever.	Malaria.	Pyrexia of uncertain origin.	Pneumonia.	Dysentery.	Venereal disease.
Group I.—Burma Coast and Bay Islands ...	1897-1906	1,188	1,260	77	17·2	...	·8	6·3	435·4	76·6	1·2	36·8	419·8
	1908	1,276	683	38	...	...	...	1·6	93·3	82·3	·8	21·2	112·1
	1909	1,311	881	51	...	...	...	1·5	133·5	254·8	2·3	19·8	147·2
,, II.—Burma Inland	1897-1906	2,105	1,253	78	4·2	1·0	·1	8·7	339·7	41·4	2·4	18·8	332·4
	1908	1,751	761	48	...	2·3	...	12·0	61·7	90·2	1·7	5·1	120·5
	1909	1,808	756	35	·5	...	...	·5	134·2	107·1	1·1	8·6	99·9
,, IV.—Bengal and Orissa	1897-1906	1,973	1,319	80	16·8	1·0	·4	9·1	380·6	31·6	3·5	54·6	333·9
	1908	1,726	844	45	1·1	...	·6	3·4	140·7	168·6	3·4	12·0	134·1
	1909	1,856	643	40	...	...	2·2	8·6	79·7	105·6	2·7	16·2	100·8
,, V.—Gangetic Plain and Chutia Nagpur.	1897-1906	6,558	1,058	73	7·0	1·6	1·0	25·2	196·6	59·0	2·3	22·8	206·4
	1908	6,641	715	40	6·5	1·7	3·6	17·3	136·6	134·6	6·3	16·9	68·5
	1909	6,167	740	43	1·6	·4	...	15·0	134·6	140·7	2·8	14·1	81·7
,, VI.—Upper Sub-Himalaya ...	1897-1906	12,710	1,146	71	4·4	·7	·7	24·0	319·0	29·1	5·2	17·9	250·1
	1908	13,428	1,148	57	14·4	·7	1·4	18·3	466·9	72·2	5·6	10·9	54·8
	1909	13,585	869	45	11·1	·1	·1	13·2	342·8	76·0	4·1	11·0	61·6
,, VII.—North-Western Frontier, Indus Valley and North-western Rajputana.	1897-1906	4,754	1,243	67	18·2	·1	1·0	15·5	452·3	39·4	6·0	14·0	211·1
	1908	4,894	1,254	53	20·8	2·0	...	20·0	590·4	210·5	5·5	9·8	40·7
	1909	5,027	991	46	83·3	...	...	10·7	367·4	107·2	3·6	6·2	50·5
,, VIII.—South Eastern Rajputana, Central India and Gujarat.	1897-1906	5,922	1,305	81	4·9	·7	1·5	33·5	301·1	23·2	3·6	22·0	322·0
	1908	5,438	1,607	44	3·4	...	·4	9·9	407·6	73·1	2·5	15·0	65·7
	1909	5,950	906	44	·8	...	·8	5·4	398·3	29·2	1·8	9·7	69·8
,, IX.—Deccan	1897-1906	9,456	1,099	71	16·2	·9	·9	21·1	269·6	31·4	2·6	74·3	330·8
	1908	10,288	668	40	3·6	·1	·4	18·5	130·0	43·7	3·9	21·6	82·6
	1909	10,149	489	28	1·5	1·0	·5	12·5	105·8	18·1	2·7	12·9	63·3
,, X.—Western Coast	1897-1906	1,550	896	63	2·1	·1	·9	4·0	147·6	17·0	2·9	12·4	288·5
	1908	1,485	703	51	...	...	...	2·0	264·6	5·4	1·3	18·9	109·8
	1909	1,402	727	54	5·0	...	...	·7	217·5	29·2	2·1	12·8	120·5
,, XI.—Southern India	1897-1906	3,302	1,117	68	3·6	·3	·5	16·0	154·9	39·5	2·0	23·7	333·0
	1908	3,671	562	55	·3	·3	...	14·2	54·5	42·0	1·6	23·6	117·1
	1909	3,612	676	49	·8	...	·6	7·2	39·9	29·1	3·6	22·1	97·5
,, XIIa.—Hill Stations	1897-1906	9,248	830	55	6·2	·3	·1	21·9	111·7	26·7	5·1	13·0	207·8
	1908	10,923	375	35	3·0	·3	·2	13·6	113·3	25·5	2·8	8·6	50·3
	1909	12,586	513	31	3·3	...	...	4·4	105·4	27·3	2·1	4·9	52·9
,, XIIb.—Hill Convalescent Depôts and Sanitaria.	1897-1906	3,358	1,086	25	5·6	·2	·2	15·4	234·8	12·4	4·3	18·5	325·2
	1908	3,813	754	65	1·6	...	...	10·8	165·5	19·2	2·6	10·2	66·6
	1909	4,186	785	69	·5	...	·2	8·6	197·3	27·5	3·8	11·9	60·9
INDIA	1897-1906	66,891	1,107	68	7·1	·7	·6	20·8	266·0	33·0	4·1	22·5	371·5
	1908	68,933	840	46	6·3	1·3	·8	14·5	244·1	73·9	3·9	14·4	69·6
	1909	71,556	717	40	9·2	·2	·3	8·9	202·8	61·3	3·9	11·2	67·8

* The decennial ratios are worked on the total strength of the ten year period.

EUROPEAN TROOPS.

TABLE II.—RATIO OF ARMIES, 1909.

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	India.*
I.—STRENGTH	37,995	31,426	71,556
II.—† CONSTANTLY SICK RATE OF EACH MONTH—			
January	46·4	43·0	43·2
February	42·3	40·0	39·8
March	37·5	35·2	35·8
April	40·0	37·6	38·3
May	41·3	41·5	41·2
June	3 ·2	41·9	40·3
July	39·4	42·2	40·7
August	44·9	4 ·7	44·3
September	45·9	42·4	43·8
October	45 5	38·8	41·5
November	52·8	36·2	39·4
December	40·0	34·8	34·8
OF THE YEAR	42·8	39·7	40·3
III.—ADMISSION RATE OF THE YEAR—			
Influenza	16·2	1·2	9·2
Cholera	·1	·3	·2
Small-pox	·2	·4	·3
Enteric Fever	10·9	6·8	8·9
Malaria	237·2	165·8	202·8
Pyrexia of uncertain origin	78·7	41·3	61·3
Tubercle of the lungs	1 1	1·2	1·1
Pneumonia	3·1	2·6	2·9
Respiratory Diseases	13·4	12·3	12·8
Dysentery	10·1	11·6	11·2
Diarrhœa	12·5	12·5	12·5
Hepatic Abscess	1·5	1·4	1·4
,, Congestion and Inflammation	7·7	6·9	7·2
Venereal Diseases	62·2	76·3	67·8
ALL CAUSES	775·0	661·0	716·9
IV.—DEATH RATE OF THE YEAR—			
Cholera	...	·22	·10
Small-pox	·03	...	·01
Enteric Fever	2·11	10·5	1·58
Malaria	·39	·35	·36
Pyrexia of uncertain origin	·03	...	·01
Heat-stroke	·20	·13	·21
Circulatory Diseases	·47	·35	·42
Tubercle of the lungs	·16	·10	·13
Pneumonia	·32	·32	·31
Respiratory Diseases	·11	·10	·10
Dysentry	·34	·16	·25
Diarrhœa	·03	...	·01
Hepatic Abscess	·61	·35	·48
ALL CAUSES	6·97	5·66	6·25
V.—PERCENTAGE IN 100 ADMISSIONS—			
Influenza	2·10	·18	1·28
Cholera	·01	·05	·02
Small-pox	·02	·06	·04
Enteric Fever	1·41	1·03	1·25
Malaria	30 61	25 08	28·29
Pyrexia of uncertain origin	10·15	6·25	8·55
Tubercle of the lungs	·14	·19	·16
Pneumonia	·40	·39	·41
Respiratory Diseases	1·73	1·87	1·78
Dysentery	1·30	1·76	1·56
Diarrhœa	1·61	1·89	1·75
Hepatic Abscess	·19	·21	·19
,, Congestion and Inflammation	1·00	1·04	1·01
Venereal Diseases	8·03	11·55	9·46
VI.—PERCENTAGE IN 100 DEATHS—			
Cholera	...	3·9	1·6
Small-pox	·4	...	·2
Enteric Fever	30·2	18·5	25·3
Malaria	5·7	6·2	5·8
Pyrexia of uncertain origin	·4	...	·2
Heat-stroke	4·2	2·2	3·4
Circulatory Diseases	6·8	6·2	6·7
Tubercle of the lungs	2·3	1·7	2·0
Pneumonia	4·5	5·6	4·9
Respiratory Diseases	1·5	1·7	1·6
Dysentery	4·9	2·8	4·0
Diarrhœa	·4	...	·2
Hepatic Abscess	8·7	6·2	7·6

* Including troops on the line of march.

† Worked on the aggregates.

EUROPEAN TROOPS.

TABLE III.—RATIOS OF GEOGRAPHICAL GROUPS, 1909.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH												
	I Burma Coast and Bay Islands.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic plain and Chutia Nagpur.	VI Upper Sub-Himalaya,	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast	XI Southern India.	XIIa Hill Stations.	XIIb Hill Convalescent Depôts, and Sanitaria.	India.*
I.—STRENGTH—	1,311	1,868	1,856	6,167	13,585	5,027	5,950	10,149	7,402	3,612	12,586	4,186	71,556
II.—†CONSTANTLY SICK-RATE OF EACH MONTH—													
January	42·4	41·4	44·1	41·1	41·0	65·1	56·5	32·5	52·3	49·0	30·1	103·5	43·2
February	54·3	37·9	42·4	34·5	37·6	56·8	46·4	31·0	35·0	50·7	29·5	95·6	39·8
March	63·8	32·3	45·5	34·1	37·8	32·8	39·9	25·9	38·8	49·6	30·6	59·6	35·8
April	67·3	25·5	46·2	47·0	45·2	39·0	36·5	27·4	52·1	48·5	26·4	53·1	38·3
May	69·3	31·0	38·9	45·6	49·1	46·7	37·8	30·6	51·2	47·5	28·0	68·7	41·2
June	64·3	40·4	35·7	42·1	45·3	45·0	35·5	29·0	58·3	45·5	29·6	66·9	40·3
July	66·1	41·7	35·8	40·4	42·7	47·2	37·7	29·7	58·7	47·6	30·1	69·4	40·7
August	41·4	38·2	41·9	42·1	54·9	47·2	49·5	31·7	60·6	52·2	33·1	69·9	44·3
September	29·5	33·7	42·3	49·4	54·6	53·5	48·8	28·9	61·4	51·8	32·2	70·3	43·8
October	31·8	33·8	36·3	46·6	57·3	49·3	52·6	24·8	67·3	48·7	30·6	62·0	41·5
November	42·7	31·2	39·1	59·1	60·4	46·4	50·1	24·0	59·4	44·8	34·8	68·3	39·4
December	40·6	30·4	30·3	38·3	39·5	35·7	40·0	25·2	52·0	46·4	36·8	74·4	34·8
OF THE YEAR ...	51·3	34·6	40·0	42·6	45·4	46·3	44·2	28·4	53·6	48·5	30·7	68·5	40·3
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	·5	...	1·6	11·1	83·3	·8	1·5	5·0	·8	3·2	·5	9·2
Cholera	...	...	...	·2	·1	...	...	1·0	...	...	...	...	·2
Small-pox	...	...	·2	...	·1	...	·8	·5	...	·6	...	·2	·3
Enteric Fever	1·5	·5	3·6	15·6	13·2	10·7	5·4	12·5	·1	7·2	4·4	8·6	8·9
Malaria	133·5	124·2	79·7	134·6	312·8	367·4	398·3	105·8	217·5	39·9	105·4	197·3	202·8
Pyrexia of uncertain origin ...	254·8	107·1	105·6	140·7	76·0	107·2	29·2	18·1	29·2	29·1	27·3	27·5	61·3
Rheumatic Fever	2·3	2·1	3·2	5·0	5·0	5·4	5·2	3·0	6·4	8·0	11·0	6·9	5·9
Tubercle of the lungs ...	·8	2·7	...	·6	1·5	2·2	1·7	·3	4·3	·8	·5	1·7	1·1
Pneumonia	2·3	1·1	2·7	2·8	4·1	3·6	1·8	2·7	2·1	3·6	2·1	3·8	2·9
Respiratory Diseases ...	12·2	10·7	13·5	14·4	14·4	13·3	12·4	9·6	17·1	14·1	10·2	22·2	12·8
Dysentery	19·8	8·6	16·2	14·1	11·0	6·2	9·7	11·9	12·8	22·1	4·9	11·9	11·2
Diarrhœa	9·9	13·4	23·2	10·4	13·2	13·3	14·6	9·1	5·0	16·6	9·8	14·3	12·5
Hepatic { Abscess	1·5	3·2	1·6	1·8	1·3	1·0	·8	1·4	2·1	1·4	·8	3·6	1·4
Hepatic { Congestion and Inflammation	3·8	8·6	7·0	8·3	5·9	7·8	11·4	7·9	5·7	6·1	5·9	10·8	7·2
Venereal Diseases	147·2	96·9	100·8	31·7	62·6	56·5	69·2	63·3	120·5	97·5	52·0	60·7	67·8
ALL CAUSES ...	881·0	756·4	643·3	739·6	869·2	991·0	905·7	488·6	726·8	675·8	512·9	785·5	716·9
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	·54	...	...	...	...	...	·59	...	...	...	...	·10
Small-pox	...	...	·54	...	...	...	...	...	...	...	...	...	·01
Enteric Fever	...	...	1·62	3·41	2·06	2·78	1·34	2·17	·71	·83	·79	·72	1·58
Malaria	·76	1·07	...	·32	·52	·80	·34	...	3·43	...	·24	·24	·36
Pyrexia of uncertain origin ...	...	...	...	...	...	·20	...	...	...	...	...	...	·01
Heat-stroke	·76	...	...	·16	·22	·99	·34	...	...	·28	...	...	·21
Circulatory Diseases ...	...	...	·54	·16	·32	·99	·34	·49	1·43	·28	·56	...	·42
Tubercle of the lungs ...	...	·54	...	...	·15	...	...	...	·71	·28	·24	·24	·13
Pneumonia	...	·54	·54	·16	·59	·20	...	·39	·71	·28	.16	·48	·31
Respiratory Diseases ...	...	...	...	...	·07	·20	·34	...	...	...	·08	·48	·10
Dysentery	...	...	...	...	·16	·52	...	·17	·10	...	·32	·72	·25
Diarrhœa	...	...	...	...	...	...	...	...	...	...	·08	...	·01
Hepatic Abscess	·76	·54	1·62	65	·59	·60	·67	·20	...	...	·24	·72	·48
ALL CAUSES ...	6·10	6·42	7·00	7·13	6·92	10·34	5·88	5·12	7·85	6·09	4·37	7·64	6·25
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	...	·07	...	·22	1·28	8·41	·09	·30	·69	·12	·62	·06	1·28
Cholera	...	...	...	·02	·01	...	...	·20	...	...	...	...	·02
Small-pox	...	...	·34	...	·02	...	·09	·10	...	·08	...	·03	·04
Enteric Fever	·17	·07	1·34	2·10	1·52	1·08	·59	2·56	·10	1·07	·85	1·09	1·25
Malaria	15·15	16·42	12·40	18·20	35·98	37·07	43·98	21·66	29·93	5·90	20·56	25·12	28·29
Pyrexia of uncertain origin ...	28·92	14·15	16·42	19·03	8·75	10·82	3·23	3·71	4·02	4·30	5·31	3·50	8·55
Rheumatic Fever	·26	·28	·50	·68	·59	·54	·58	·60	·88	1·19	2·15	·88	·82
Tubercle of the lungs ...	·09	·35	...	·09	·17	·22	·19	·06	·89	·12	·09	·21	·16
Pneumonia	·26	·14	·42	·39	·48	·36	·20	·54	·29	·53	·42	·49	·41
Respiratory Diseases ...	1·39	1·42	2·09	1·95	1·65	1·34	1·37	1·96	2·36	2·09	2·00	2·83	1·78
Dysentery	2·25	1·13	2·51	1·91	1·26	·62	1·08	2·44	1·77	3·28	·96	1·52	1·56
Diarrhœa	1·13	1·77	3·60	1·40	1·52	1·34	1·61	1·86	·69	2·46	1·91	1·82	1·75
Hepatic { Abscess	·17	·42	·25	·24	·15	·10	·09	·28	·29	·20	·15	·46	·19
Hepatic { Congestion and Inflammation	·43	1·13	1·09	1·12	·68	·78	1·26	1·61	·79	·90	1·15	1·37	1·01
Venereal Diseases	16·71	12·82	15·66	11·05	7·20	5·70	7·65	12·95	16·58	14·42	10·13	7·73	9·46
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	...	8·3	...	...	...	...	...	11·5	...	...	...	...	1·6
Small pox	...	...	7·7	...	...	...	...	...	...	...	...	...	·2
Enteric Fever	...	...	23·1	47·7	29·8	26·9	22·9	42·3	9·1	13·6	18·2	9·4	25·3
Malaria	12·5	16·7	...	4·5	7·4	7·7	5·7	...	18·2	...	5·5	3·1	5·8
Pyrexia of uncertain origin ...	...	...	...	...	...	1·9	...	...	...	...	...	...	·2
Heat-stroke	12·5	...	...	2·3	3·2	6·6	5·7	...	...	4·5	...	...	3·4
Circulatory Diseases ...	...	...	7·7	2·3	5·3	9·6	5·7	9·6	18·2	4·5	12·7	...	6·7
Tubercle of the lungs ...	...	8·3	...	...	2·1	...	...	...	9·1	4·5	5·5	3·1	2·0
Pneumonia	...	8·3	7·7	2·3	8·5	1·9	...	7·7	9·1	4·5	3·6	6·2	4·9
Respiratory Diseases ...	...	...	...	...	1·1	1·9	5·7	...	...	...	1·8	6·2	1·6
Dysentery	...	...	...	2·3	7·4	...	2·9	1·9	...	...	7·3	9·4	4·0
Diarrhœa	...	...	...	...	...	...	...	...	...	...	1·8	...	·2
Hepatic Abscess	12·5	8·3	23·1	9·1	8·5	5·8	11·4	3·8	...	...	5·5	9·4	7·6

* Including troops on the line of march.

† Worked on the aggregates.

EUROPEAN TROOPS.

TABLE V.—ADMISSION AND DEATH RATES FROM ENTERIC FEVER IN STATIONS OF OVER 1,000 STRENGTH.

Stations.	1909.		DECENNIUM, 1897-1906.		Stations.	1909.		DECENNIUM, 1897-1906.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Meerut	26·0	3·25	35·9	10·21	Secunderabad ...	6·7	2·68	22·0	4·87
Kirkee	26·0	2·89	30·6	4·47	Fort William ...	5·8	...	3·4	·36
Lahore Cantonment ...	25·9	1·73	23·2	6·03	Wellington Depôt ...	5·6	...	19·2	1·56
Lucknow	23·2	3·72	39·3	8·35	Quetta	4·8	·68	30·1	7·34
Sialkot	20·7	2·70	16·1	5·29	Chakrata	3·6	·72	24·9	2·80
Bareilly	15·1	5·64	14·9	3·11	Karachi	3·6	...	5·5	1·63
Nowshera	14·3	5·71	11·2	3·88	Ambala	3·1	·44	30·9	7·78
Poona	12·4	1·91	23·9	5·12	Mhow	2·8	·57	35·6	8·45
Jubbulpore	11·9	1·48	32·1	8·44	Aden	2·7	...	6·6	2·48
Peshawar	11·3	3·13	29·4	11·48	Rangoon	1·5	...	6·9	1·78
Bangalore	10·9	1·36	23·9	4·03	Colaba	·9	·95	3·2	1·62
Ranikhet	9·6	1·60	23·4	3·62	...	...	...	...	...
Jhansi	7·5	·94	35·6	10·75	...	...	...	...	...
Rawalpindi	7·2	1·04	26·3	5·29	...	...	...	...	...

TABLE VI.—ARRIVALS, AGE AND LENGTH OF RESIDENCE IN RELATION TO VENEREAL DISEASE AND ENTERIC FEVER.

YEAR.	ARRIVED IN INDIA.*		YEAR.	MEN.							
				PER CENT OF STRENGTH.			Strength.	RATIO PER 1,000.			RATIO PER CENT OF TOTAL ADMISSION.	
	Men.	Women.		Age.	Length of residence.	Married.†		Admissions.			Venereal Diseases.	Enteric Fever.
				Under 25 years.	Under 5 years.			All causes.	Venereal Diseases.	Enteric Fever.		
1890-91	14,046	542	1890	50	80	3·70	67,823	1,520·2	503·5	18·5	33·12	1·22
1891-92	15,456	529	1891	51	79	3·36	67,030	1,379·1	400·7	20·4	29·06	1·48
1892-93	15,894	540	1892	51	80	3·29	68,137	1,517·3	409·9	22·1	27·01	1·46
1893-94	15,090	482	1893	53	79	3·29	70,091	1,414·9	466·0	20·0	32·94	1·42
1894-95	15,957	517	1894	54	81	...†	71,082	1,508·0	511·4	20·9	33·91	1·38
1895-96	14,346	654	1895	55	83	...	71,031	1,461·8	522·3	26·3	35·73	1·80
1896-97	14,805	545	1896	56	82	...	70,454	1,386·7	511·6	25·5	36·89	1·84
1897-98	16,227	543	1897	55	84	...	68,395	1,556·9	485·7	32·4	31·20	2·08
1898-99	16,911	648	1898	54	81	...	67,741	1,436·9	362·9	36·9	25·26	2·57
1899-1900	3,369	168	1899	53	78	...	67,697	1,148·7	313·4	20·6	27·28	1·79
1900-01	5,958	185	1900	45	69	...	60,553	1,143·2	298·1	16·0	26·07	1·40
1901-02	18,594	438	1901	42	63	...	60,838	1,164·3	276·0	12·8	24·99	1·16
1902-03	24,840	961	1902	43	68	...	60,540	1,078·4	281·4	16·7	26·09	1·55
1903-04	15,126	758	1903	51	76	...	70,445	1,033·4	247·0	19·6	23·90	1·90
1904-05	16,366	820	1904	52	80	...	71,083	900·4	198·5	19·6	22·05	2·18
1905-06	15,178	804	1905	52	84	...	71,343	834·3	153·7	16·1	18·42	1·93
1906-07	18,636	912	1906	51	84	...	70,272	870·8	117·3	15·6	13·47	1·79
1907-08	16,083	1,049	1907	...†	...†	...	69,332	756·4	89·9	13·1	11·89	1·74
1908-09	17,182	1,130	1908	...†	...†	...	68,933	839·5	69·6	14·5	8·30	1·73
1909-10	14,830	992	1909	...†	...†	...	71,556	716·9	67·8	8·9	9·46	1·25

* In ordinary years the departures *plus* the deaths nearly balance the arrivals. † Return abolished. ‡ On the first May of each year.

EUROPEAN TROOPS.

TABLE IX.—STATISTICS OF OFFICERS.

A.—SICKNESS AND MORTALITY AMONG OFFICERS OF THE BRITISH ARMY IN 1909.

	Northern Army.		Southern Army.		India.*	
STRENGTH	1,144		1,037		2,296	
CASES REMAINING FROM 1908	32		18		50	
	Ratios.	Actuals.	Ratios.	Actuals.	Ratios.	Actuals.
CONSTANTLY SICK	25·7	29·35	24·5	25·38	24·0	54·77
INVALIDINGS	17·48	20	20·25	21	17·86	41
ADMISSIONS.						
Influenza	19·2	22	9·6	10	14·4	33
Cholera	...	...	...	...	...	...
Small-pox	...	...	1·9	2	·9	2
Enteric Fever	14·9	17	13·5	14	13·9	32
Malaria	90·9	104	100·3	104	91·0	209
Pyrexia of uncertain origin	90·0	103	66·5	69	77·5	178
Tubercle of the lungs	·9	1	...	...	·4	1
Pneumonia	2·6	3	2·9	3	2·6	6
Respiratory Diseases	11·4	13	17·4	18	13·5	31
Dysentery	21·0	24	18·3	19	18·7	43
Diarrhœa	28·8	33	15·4	16	21·8	50
Hepatic Abscess	3·5	4	1·0	1	2·2	5
„ Congestion and Inflammation	18·4	21	17·4	18	17·4	40
Venereal Diseases	...	...	3·9	4	1·7	4
ALL CAUSES	707·2	809	614·3	637	634·5	1,466
DEATHS.						
Cholera	...	...	...	...	·44	1
Small-pox	...	...	...	...	...	...
Enteric Fever	...	...	·96	1	·44	1
Malaria	...	...	...	...	...	...
Pyrexia of uncertain origin	...	...	...	...	...	...
Heat-stroke	1·75	2	...	...	·87	2
Circulatory Diseases	...	...	...	...	...	...
Tubercle of the lungs	...	...	...	...	...	...
Pneumonia	...	...	...	...	...	...
Respiratory Diseases	...	...	...	...	...	...
Dysentery	·87	1	·96	1	·87	2
Diarrhœa	...	...	...	...	...	...
Hepatic Abscess	...	...	·96	1	·44	1
Deaths not reported in Medical returns	...	...	...	...	1·74	4‡
ALL CAUSES	6·99	8	10·61	11	9·58	22
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES	...	...	...	...	12·63	29†

* Including officers on the line of march.
‡ Murdered 1, sleeping sickness 1, drowning 1 and suicide not defined 1.)
† Abscess of liver 1, and the causes of death in the other 6 cases not known.

B.—CAUSES OF DEATH AMONG EUROPEAN OFFICERS* OF INDIAN ARMY IN 1909. (FROM NON-MEDICAL SOURCES.)

ARMY.	Strength in India, whether on leave or not, on the 1st of July 1909.	Strength in Europe or beyond sea on 1st July 1909, whether on furlough or sick leave.	IN INDIA. Cholera.	Small-pox.	Enteric Fever.	Malaria.	Pyrexia of uncertain origin.	Heat-stroke.	Circulatory Diseases.	Tubercle of the lungs.	Pneumonia.	Respiratory Diseased.	Dysentery.	Diarrhœa.	Hepatic Abscess.	TOTAL.	Deaths in England and other countries.	Deaths at sea.	GRAND TOTAL.	Ratio per 1,000.
INDIAN	2,743	853	...	...	3	1	...	...	...	...	1	...	1	...	...	12	8	1	21(a)	5·84

* Only Officers in Military employ have been included.
(a) The place and cause of deaths of 2 officers not known.

Native Troops.

Table X.—Summary, Sickness and Mortality.

A.—Armies and Divisions.	Years.	Average strength.	Ratio per mille of strength.											
			Admissions into hospital.	Constantly sick.	Deaths from									
					Cholera.	Small-pox.	Enteric fever.	Malaria.	Tubercle of the lungs.	Pneumonia.	Dysentery.	Abscess of the liver.	All causes.	Mortality including absent deaths.*
Northern Army	1908	62,141	797	26	1·24	·02	·76	·84	·50	2·96	·13	·03	8·69	...
	1909	64,544	666	23	·11	·09	·62	·26	·51	2·40	·20	·05	6·72	...
Southern Army	1908	50,822	599	21	·55	·04	·51	·39	·31	1·71	·39	...	6·30	...
	1909	53,470	545	20	·21	·04	·32	·36	·32	1·65	·09	·06	5·27	...
1st (Peshawar) Division ...	1908	9,205	944	33	1·96	...	·33	1·63	·22	3·37	·22	...	10·65	...
	1909	9,902	860	29	...	·10	·61	·10	·50	2·73	·20	...	6·77	...
2nd (Rawalpindi) ,, ...	1908	10,568	694	26	3·50	...	1·51	·38	·47	3·22	·28	...	11·26	...
	1909	10,825	527	21	...	·37	·37	·18	·55	2·59	·09	...	6·37	...
3rd (Lahore) ,, ...	1908	11,801	582	18	·34	...	·42	1·02	·59	3·14	...	...	7·46	...
	1909	12,217	444	17	...	·08	·33	·33	·49	3·27	·08	·08	6·96	...
4th (Quetta) ,, ...	1908	9,192	608	21	·44	...	·87	·22	·33	3·81	·33	...	8·38	...
	1909	9,832	553	21	...	...	·81	·31	1·02	4·27	·31	...	9·76	...
5th (Mhow) ,, ...	1908	15,200	693	21	·07	·13	·66	·39	·33	·99	·20	...	4·47	...
	1909	15,198	626	21	...	...	·39	·20	...	1·05	...	·07	3·16	...
6th (Poona) ,, ...	1908	9,994	542	22	...	...	·60	·50	·20	1·00	·50	...	5·30	...
	1909	10,585	594	21	·76	...	·28	·47	·28	·94	·09	·09	4·91	...
7th (Meerut) ,, ...	1908	11,702	720	26	·26	·09	1·28	·77	·85	1·62	...	·09	7·61	...
	1909	12,211	539	22	·57	...	·66	·25	·82	1·64	·25	·81	7·78	...
8th (Lucknow) ,, ...	1908	10,393	666	23	·96	...	·10	·77	·67	2·89	·10	...	7·51	...
	1909	11,065	638	22	...	...	·81	·36	·45	1·99	·45	...	5·96	...
9th (Secunderabad) Division ...	1908	10,445	476	19	2·20	...	·19	·19	·29	1·24	·48	...	8·33	...
	1909	11,451	383	15	·26	·09	...	·26	·17	1·14	·09	...	4·45	...
Burma Division	1908	4,950	663	26	...	...	...	·81	·40	1·41	·20	...	4·24	...
	1909	5,305	675	23	...	·19	...	·75	·38	·94	...	·19	4·90	...
Kohat, Derajat and Bannu Brigades	1908	8,472	1,330	33	·59	...	·83	·47	...	3·90	·24	·12	8·03	...
	1909	8,324	1,166	31	...	...	1·08	·36	·12	2·16	·12	·12	6·25	...
Aden Brigade	1908	1,041	621	25	...	...	...	·96	·96	6·72	2·88	...	13·45	...
	1909	1,099	785	28	...	...	...	·91	...	1·82	...	...	8·19	...
Army of India	1908	1,26,975	674	23	·91	·02	·57	·58	·42	2·20	·22	·02	7·41	8·49
	1909	1,31,627	584	21	·14	·06	·43	·28	·39	1·88	·14	·05	5·62	6·42

* Worked on the average annual strength of the troops present with and absent from their regiments during the year.

B—Geographical Groups.	Years.	Average strength.*	Ratio per mille of strength.											
			Admissions.	Constantly sick.	Admissions from									
					Influenza.	Cholera.	Small-pox.	Enteric fever.	Malaria.	Pyrexia of uncertain origin.	Pneumonia.	Dysentery.	Venereal diseases.	
Group I—Burma Coast and Bay Islands.	1897-1906	1,435	721	27	5·4	·1	·2	·1	191·4	17·8	2·6	64·9	47·5	
	1908	1,286	632	19	...	...	...	...	130·6	112·8	2·3	83·2	13·2	
	1909	1,419	727	24	...	...	...	...	69·1	193·8	2·8	74·7	14·8	
,, II.—Burma Inland ...	1897-1906	3,955	865	32	1·9	·2	·1	·1	427·4	9·2	2·6	31·3	31·8	
	1908	2,823	661	27	...	...	...	2·1	230·3	3·5	6·4	22·7	13·5	
	1909	2,887	653	23	1·7	...	·3	·3	194·7	86·9	1·0	11·8	15·6	
,, III.—Assam	1897-1906	1,327	859	37	3·5	1·3	...	2·0	349·3	3·2	8·0	79·9	48·1	
	1908	923	882	23	...	2·2	...	...	446·4	9·8	8·7	33·6	23·8	
	1909	961	983	32	...	...	...	...	390·2	2·1	11·4	56·2	14·6	
,, IV.—Bengal and Orissa ...	1897-1906	2,528	972	35	8·9	·4	·5	·4	504·3	5·7	5·6	64·8	36·6	
	1908	2,219	731	28	·5	...	...	·9	240·2	25·7	0·9	81·1	16·7	
	1909	2,227	475	19	...	...	...	·4	79·5	44·5	8·1	67·8	10·3	
,, V.—Gangetic Plain and Chutia Nagpur.	1897-1906	6,251	575	24	4·3	1·0	·6	·4	175·7	6·0	7·8	38·4	26·4	
	1908	5,972	604	20	·2	2·7	1·3	·2	252·2	7·5	13·9	55·4	15·2	
	1909	6,712	601	21	1·0	...	...	1·6	203·4	12·2	13·1	43·4	17·9	
,, VI.—Upper Sub-Himalaya ...	1897-1906	15,882	618	24	1·8	·7	·6	·8	238·9	3·5	15·0	27·9	24·7	
	1908	21,426	704	23	1·7	·8	1·1	5·2	334·3	22·4	14·1	39·5	13·9	
	1909	21,280	547	21	2·1	·1	·2	3·3	163·6	27·3	16·5	27·9	20·4	
,, VII.—North-West Frontier, Indus Valley, and North Western Rajputana.	1897-1906	16,892	894	30	4·7	1·5	·7	·4	394·1	4·9	22·4	53·0	17·7	
	1908	17,733	1,116	32	3·3	1·5	·2	4·2	544·3	7·8	21·3	53·3	8·7	
	1909	18,853	1,014	29	5·6	...	·6	2·5	419·3	21·1	19·1	49·2	11·4	
,, VIII.—South-Eastern Rajputana, Central India and Gujarat.	1897-1906	12,058	778	28	1·8	1·0	·7	·4	338·9	8·7	14·7	29·6	41·3	
	1908	12,114	687	21	1·0	...	·5	1·2	288·8	2·6	12·3	23·9	17·0	
	1909	11,979	607	20	·8	...	·7	3·3	218·1	5·8	9·7	18·8	16·8	
,, IX.—Deccan	1897-1906	17,042	613	23	4·0	1·4	·6	·4	207·9	12·2	8·0	30·2	42·9	
	1908	17,631	485	19	9·2	1·9	3·0	2·4	106·9	23·1	6·6	30·7	23·7	
	1909	18,638	455	18	6·0	·5	·5	1·3	90·8	23·1	6·7	25·9	19·7	
,, X.—Western Coast ...	1897-1906	2,279	735	31	2·4	·3	1·4	·1	203·1	11·2	10·2	60·1	51·2	
	1908	1,707	920	34	1·8	...	2·2	2·3	309·5	12·9	5·9	70·3	53·3	
	1909	1,787	793	31	...	·6	·6	1·7	241·7	7·8	5·0	83·9	48·1	
,, XI.—Southern India ...	1897-1906	6,790	616	29	3·0	1·6	·6	·3	162·3	21·8	8·8	23·3	42·6	
	1908	4,623	561	21	·2	2·4	·2	·4	155·5	17·7	7·8	35·0	26·0	
	1909	5,437	455	18	...	1·1	·4	·6	84·8	16·9	11·8	29·2	22·3	
,, XII.—Hill Stations ...	1897-1906	20,412	845	34	9·7	·5	·3	1·0	337·5	12·3	19·0	45·8	34·6	
	1908	23,465	625	23	4·8	1·8	·2	3·7	236·3	18·9	15·5	33·2	13·7	
	1909	24,735	481	20	2·9	·3	·2	3·1	124·0	16·7	12·5	20·6	14·6	
Army of India ...	1897-1906	1,25,487	725	27	5·1	1·0	·5	·5	289·5	8·8	13·6	42·7	30·5	
	1908	1,26,975	674	23	3·8	1·4	·8	2·8	266·2	16·2	12·8	39·5	15·2	
	1909	1,31,627	584	21	2·9	·2	·3	2·2	179·8	22·2	11·8	31·8	16·4	

* The decennial ratios are worked on the total strength of the ten-year period.

NATIVE TROOPS.

TABLE XI.—RATIOS OF ARMIES.

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	64,544	53,470	131,627
II.—CONSTANTLY SICK RATE OF EACH MONTH—			
January	23·6	21·8	21·3
February	21·0	18·9	18·9
March	17·9	18·5	17·6
April	18·7	18·8	18·2
May	21·7	20·0	20·2
June	21·2	19·6	19·9
July	20·3	19·8	19·9
August	22·0	20·4	20·9
September	24·2	20·4	21·9
October	26·8	20·5	22·8
November	31·8	21·4	23·9
December	27·9	20·6	22·4
OF THE YEAR	23·2	20·2	20·8
III.—ADMISSION RATE OF THE YEAR—			
Influenza	3·4	2·5	2·9
Cholera	·2	·3	·2
Small-pox	·3	·4	·3
Enteric Fever	2·8	1·8	2·2
Malaria	234·1	137·5	179·8
Malta Fever	·2	·1	·1
Pyrexia of uncertain origin	21·7	26·6	22·
Plague	·1	·1	·1
Tubercle of the lungs	2·7	2·1	2·3
Pneumonia	15·0	9·2	11·8
Respiratory Diseases	18·9	22·8	21·4
Dysentery	35·2	27·9	31·8
Diarrhœa	6·7	8·8	7·6
Hepatic { Abscess	·1	·1	·1
Hepatic { Congestion and Inflammation	·6	·9	·7
Scurvy	·9	2·0	1·4
Venereal Diseases	16·1	18·4	16·4
ALL CAUSES	666·2	544·6	584·2
IV.—DEATH RATE OF THE YEAR—			
Cholera	·11	·21	·14
Small-pox	·09	·04	·06
Enteric Fever	·62	·32	·43
Malaria	·26	·36	·28
Malta Fever	·03	...	·02
Pyrexia of uncertain origin	·15	·13	·13
Plague	·03	·11	·06
Circulatory Diseases	·28	·19	·24
Tubercle of the lungs	·31	·32	·39
Pneumonia	2·40	1·65	1·88
Respiratory Diseases	·23	·21	·21
Dysentery	·20	·09	·14
Diarrhœa	·06	·02	·04
Hepatic Abscess	·05	·06	·05
Anæmia and Debility	·05	·06	·05
ALL CAUSES	6·72	5·27	5·62
V.—PERCENTAGE IN 100 ADMISSIONS—			
Influenza	·51	·46	·50
Cholera	·02	·05	·03
Small-pox	·05	·08	·06
Enteric Fever	·42	·34	·37
Malaria	35·14	25·25	30·78
Malta Fever	·03	·01	·02
Pyrexia of uncertain origin	3·25	4·88	3·80
Plague	·02	·02	·02
Tubercle of the lungs	·41	·38	·40
Pneumonia	2·26	1·69	2·02
Respiratory Diseases	2·84	4·18	3·67
Dysentery	5·29	5·12	5·44
Diarrhœa	1·01	1·61	1·31
Hepatic { Abscess	·01	·02	·01
Hepatic { Congestion and Inflammation	·08	·16	·11
Scurvy	·13	·37	·24
Venereal Diseases	2·41	3·37	2·81
VI.—PERCENTAGE IN 100 DEATHS—			
Cholera	1·6	3·9	2·4
Small-pox	1·4	·7	1·1
Enteric Fever	9·2	6·0	7·7
Malaria	3·9	6·7	5·0
Malta Fever	·5	...	·3
Pyrexia of uncertain origin	2·3	2·5	2·3
Plague	·5	2·1	1·1
Circulatory Diseases	4·1	3·5	4·2
Tubercle of the lungs	7·6	6·0	6·9
Pneumonia	35·7	31·2	33·5
Respiratory Diseases	3·5	3·9	3·6
Dysentery	3·0	1·8	2·6
Diarrhœa	·9	·4	·7
Hepatic Abscess	·7	1·1	·8
Anæmia and Debility	·7	1·1	·8

NATIVE TROOPS.

TABLE XII.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations	Army of India.*
I.—AVERAGE ANNUAL STRENGTH ...	1,419	2,·87	961	2,227	6,712	21,280	18,853	11,979	18,638	1,787	5,437	24·735	131,627
II.—CONSTANTLY SICK RATE OF EACH MONTH—													
January	24·7	20·3	28·9	23·0	18·8	20·2	31·1	21·7	20·2	40·0	16·0	21·6	21·3
February	18·6	17·3	23·3	16·6	20·1	18·8	26·2	19·1	16·6	31·6	17·6	19·5	18·9
March	18·9	23·3	19·7	12·9	16·7	15·6	22·8	17·3	15·7	33·0	16·7	18·0	17·6
April	30·3	20·5	22·9	16·6	18·2	16·8	23·0	18·0	16·6	29·6	18·7	17·5	18·2
May	24·5	20·2	30·6	13·8	18·2	19·3	29·5	20·7	17·8	27·0	20·6	18·3	20·2
June	35·1	25·7	41·6	15·2	15·7	18·0	29·1	18·6	18·2	25·7	20·2	17·6	19·9
July	24·3	32·4	42·0	19·9	19·7	17·7	24·7	18·8	18·4	29·9	17·7	17·7	19·9
August	19·2	25·7	40·0	20·4	19·0	19·5	26·2	24·0	18·2	28·9	15·3	20·0	20·9
September	25·1	24·2	36·9	20·3	23·1	21·9	27·5	22·0	17·2	34·8	17·4	22·9	21·9
October	28·0	23·1	34·0	22·8	27·0	24·0	34·7	21·9	17·1	27·3	15·8	22·8	22·8
November	25·9	23·6	32·1	21·7	27·1	31·6	39·7	20·5	18·3	36·1	18·5	24·2	23·9
December	17·8	19·6	28·6	19·9	25·0	26·2	35·7	21·2	17·9	34·2	19·8	22·2	22·4
OF THE YEAR	24·0	22·9	32·3	19·3	20·9	21·0	29·4	20·4	17·8	31·3	18·0	20·3	20·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	1·7	...	...	1·0	2·1	5·6	·8	6·0	...	...	2·9	2·9
Cholera	...	...	...	...	...	·1	...	...	·5	·6	1·1	·3	·2
Small-pox	...	·3	...	...	...	·2	·6	·7	·5	·6	·4	·2	·3
Enteric Fever	...	·3	...	·4	1·6	3·3	2·5	3·3	1·3	1·7	·6	3·1	2·2
Malaria	69·1	194·7	390·2	79·5	203·4	163·6	419·3	218·1	90·8	241·7	84·8	124·9	179·8
Malta Fever	...	...	...	...	...	·2	·2	...	·1	...	...	·2	·1
Pyrexia of uncertain origin	193·8	86·9	2·1	44·5	12·2	27·3	21·1	5·8	23·1	7·8	15·9	16·7	22·2
Plague ...	...	...	...	...	·1	·2	·1	·3	·1	·6	·2	·1	·1
Tubercle of the lungs	·7	1·4	4·0	1·8	2·8	2·7	2·9	2·1	1·2	1·1	1·5	3·5	2·3
Pneumonia	2·8	1·0	11·4	8·1	13·1	16·5	19·1	9·7	6·7	5·0	11·8	14·5	11·8
Respiratory Diseases	50·0	18·4	41·6	20·7	15·9	14·5	25·9	15·7	16·3	56·0	15·6	2·7	21·4
Dysentery	74·7	11·8	56·2	67·8	43·4	27·9	49·2	18·8	25·9	83·9	29·2	20·6	31·8
Diarrhœa	3·5	8·0	23·9	6·3	6·4	4·3	11·7	4·3	7·8	12·3	5·5	8·4	7·6
Hepatic { Abscess	...	...	...	...	·1	·1	·1	·3	·1	...	·2	·1	·1
Hepatic { Congestion and Inflammation	1·4	2·1	...	2·7	·7	·6	·4	·5	1·2	1·7	·6	·4	·7
Scurvy	1·4	·3	15·6	2·2	·9	·4	1·1	·9	·6	2·8	·2	2·2	1·4
Venereal Diseases	14·8	15·6	14·6	10·3	17·9	20·4	11·4	16·8	19·7	48·1	22·3	14·6	16·4
ALL CAUSES	727·3	653·3	983·4	474·6	601·2	546·5	1,014·4	607·0	455·5	792·9	455·2	480·9	584·2
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	...	·14	...	...	·43	·56	·37	·16	·14
Small-pox	...	...	...	...	...	·05	·05	...	...	...	·18	·20	·06
Enteric Fever	...	...	...	·45	·74	·56	·64	·50	·11	·56	...	·73	·43
Malaria	·70	1·04	1·04	·45	·15	·23	·21	·33	·27	1·12	·37	2·4	·28
Malta Fever	...	...	...	...	...	...	·11	...	...	...	...	...	·02
Pyrexia of uncertain origin	...	...	...	·45	·60	·23	...	·17	·11	...	...	·08	·13
Plague ...	...	...	...	...	...	·09	...	·25	·05	·56	·18	...	·06
Circulatory Diseases	...	...	...	...	·45	·23	·27	...	·11	...	·74	·28	·24
Tubercle of the lungs	...	·35	...	·45	·30	·23	·37	...	·41	1·12	·18	1·17	·39
Pneumonia	2·11	·35	...	·45	1·94	3·20	2·76	1·34	·97	...	1·47	2·47	1·88
Respiratory Diseases	·70	...	...	...	...	·33	·32	...	·16	1·12	...	·28	·21
Dysentery	...	...	1·04	·45	·45	·23	·16	...	·05	·56	...	·12	·14
Diarrhœa	...	...	...	·45	...	·09	·05	·08	...	...	...	...	·04
Hepatic Abscess	...	...	...	...	...	·05	·05	·17	·05	...	...	·04	·05
Anæmia and Debility	·70	...	...	...	...	·05	·05	...	·05	...	...	·08	·05
ALL CAUSES	7·05	3·46	3·12	4·04	5·66	7·57	6·74	3·76	3·76	6·72	5·52	7·77	5·62
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	...	·27	...	...	·17	·39	·55	·12	1·31	...	...	·61	·50
Cholera	...	...	...	...	...	·03	...	...	·11	·07	·24	·06	·03
Small-pox	...	·05	...	...	...	·04	·06	·11	·12	·07	·08	·04	·06
Enteric Fever	...	·05	...	·09	·27	·61	·25	·54	·29	·21	·12	·64	·37
Malaria	9·50	29·80	39·68	16·75	33·83	29·94	41·34	35·94	19·93	30·49	18·63	25·79	30·78
Malta Fever	...	...	...	...	...	·04	·02	...	·02	...	..	·03	·02
Pyrexia of uncertain origin	26·65	13·31	·21	9·37	2·03	5·00	2·08	·95	5·07	·99	3·72	3·45	3·80
Plague ...	...	...	...	...	·02	·03	·01	·04	·02	·07	·04	·02	·02
Tubercle of the lungs	·10	·21	·11	·38	·47	·49	·28	·34	·27	·14	·22	·72	·40
Pneumonia	·39	·16	1·16	1·70	2·18	3·03	1·89	1·60	1·46	·64	2·59	2·59	2·02
Respiratory Diseases	6·88	2·81	4·23	4·35	2·65	2·65	2·55	2·59	3·58	7·06	3·43	5·15	3·67
Dysentery	10·27	1·80	5·71	14·29	7·21	5·11	4·85	3·09	5·69	10·50	6·42	4·28	5·44
Diarrhœa	·48	1·22	2·43	1·32	1·07	·78	1·15	·72	1·71	1·55	1·21	1·76	1·31
Hepatic { Abscess	...	...	...	...	·02	·02	·01	·04	·01	...	·04	·02	·01
Hepatic { Congestion and Inflammation	·19	·32	...	·57	·12	·10	·04	·08	·27	·21	·12	·08	·11
Scurvy	·19	·05	1·59	·47	·15	·07	·11	·15	·13	·35	·04	·45	·24
Venereal Diseases	2·03	2·39	1·48	2·18	2·97	3·74	1·12	2·76	4·34	6·07	4·89	3·04	2·81
VI.—PERCENTAGE IN 100 DEATHS—													
Cholera	...	...	...	...	...	1·9	...	...	11·4	8·3	6·7	2·1	2·4
Small-pox	...	...	...	...	...	·6	·8	...	...	...	3·3	2·6	1·1
Enteric Fever	...	...	...	11·1	13·2	7·5	9·4	13·3	2·9	8·3	...	9·4	7·7
Malaria	10·0	30·0	33·3	11·1	2·6	3·1	3·1	8·9	7·1	16·7	6·7	3·1	5·0
Malta Fever	...	...	...	...	...	...	1·6	...	...	...	...	...	·3
Pyrexia of uncertain origin	...	...	..	11·1	10·5	3·1	...	4·4	2·9	...	...	1·0	2·3
Plague ...	...	...	...	...	...	1·2	...	6·7	1·4	8·3	3·3	...	1·1
Circulatory Diseases	...	...	...	...	7·9	3·1	3·9	...	2·9	...	13·3	3·6	4·2
Tubercle of the lungs	...	10·0	...	11·1	5·3	3·1	5·8	...	2·9	16·7	3·3	15·1	6·9
Pneumonia	30·0	10·0	...	11·1	34·2	42·2	40·9	35·6	25·7	...	26·7	31·8	33·5
Respiratory Diseases	10·0	...	...	...	...	4·3	4·7	...	4·3	16·7	...	3·6	3·6
Dysentery	...	...	33·3	11·1	7·9	3·1	2·4	...	1·4	8·3	...	1·6	2·6
Diarrhœa	...	...	...	11·1	...	1·2	·8	2·2	...	...	...	...	·7
Hepatic Abscess	...	...	...	...	...	·6	·8	4·4	1·4	...	...	·5	·8
Anæmia and Debility	10·0	...	...	...	...	·6	·8	...	1·4	...	...	1·0	·9

* Including Group Extra India.

NATIVE TROOPS.

TABLE XIII.—SICKNESS AND MORTALITY IN PLAINS AND HILLS (1—ACTUALS. 2—RATIOS.)

C.—PLAINS AND HILLS.	Average annual strength.	Malaria.		Tubercle of the lungs.		Pneumonia.		Respiratory diseases.		Dysentery and Diarrhœa.		Scurvy.		Anæmia and Debility.		All causes.		Average number constantly sick.
		A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	
1905. Plains ...	99,771	15,130	69	287	33	1,266	185	2,528	23	3,771	18	124	3	1,080	9	55,250	602	2,083
		151·6	·69	2·9	·33	12·7	1·86	25·3	·21	37·8	·18	1·2	·03	10·8	·09	553·8	6·03	20·9
Hills ...	20,224	3,677	26	93	26	277	50	920	5	850	9	84	1	253	...	14,749	365	624
		181·8	1·29	4·6	1·29	13·7	2·37	45·5	·35	42·0	·45	4·2	·05	12·5	...	729·3	18·05	30·9
Hills above 5,000 feet sea-level.	9,583	1,357	11	46	13	95	20	333	2	341	6	50	1	100	...	5,698	260	260
		141·6	1·15	4·8	1·36	9·9	2·09	34·7	·21	35·6	·63	5·2	·10	10·4	...	594·6	27·13	27·1
Hills below 5,000 feet sea-level.	10,641	2,320	15	47	13	182	30	587	3	509	3	34	...	153	...	9,051	105	364
		218·1	1·41	4·4	1·22	17·1	2·63	55·2	·47	47·8	·28	3·2	...	14·4	...	850·6	9·87	34·2
1906. Plains ...	101,783	26,833	64	221	32	856	159	2,108	14	4,656	27	214	10	1,349	3	68,275	665	2,201
		263·7	·62	2·2	·31	8·4	1·56	30·7	·14	45·7	·27	2·1	·10	13·2	·03	670·8	6·53	21·6
Hills ...	22,469	6,250	16	79	29	285	39	754	2	926	8	92	...	347	2	17,057	158	646
		2,78·2	·71	3·5	1·29	12·7	1·74	33·6	·09	41·2	·36	4·1	...	15·4	·09	759·1	7·03	28·8
Hills above 5,000 feet sea-level.	11,510	2,546	8	34	9	118	17	289	2	437	·7	70	...	163	2	6,923	78	293
		221·2	·69	3·0	·78	10·3	1·48	25·1	·17	38·0	·61	6·1	...	14·2	·17	601·5	6·78	25·5
Hills below 5,000 feet sea-level.	10,959	3,704	8	45	20	167	22	465	...	489	1	22	...	184	...	10,134	80	353
		338·0	·72	4·1	1·82	15·2	2·01	42·4	...	44·6	·09	2·0	...	16·8	...	924·7	7·30	32·2
1907. Plains ...	99,460	22,265	50	218	25	1,171	185	2,464	19	3,802	17	223	14	1,168	6	61,973	582	2,047
		224·1	·50	2·2	·25	11·8	1·86	24·8	·19	38·2	·17	2·2	·14	11·8	·06	623·2	5·85	20·6
Hills ...	22,399	5,155	32	52	13	379	66	660	6	982	8	54	2	338	3	14,412	187	56·8
		230·2	1·43	2·3	·58	16·9	29·5	29·5	·27	43·8	·36	2·4	·09	15·1	·13	643·4	8·35	25·4
Hills above 5,000 feet sea-level.	11,378	1,292	8	22	7	152	16	231	3	501	4	42	2	129	...	5,499	59	230
		113·5	·71	1·9	·62	13·4	1·41	20·3	·26	44·6	·35	3·7	·18	11·3	...	483·3	5·19	20·2
Hills below 5,000 feet sea-level.	11,021	3,863	24	30	6	227	50	429	3	481	4	12	...	209	3	8,913	128	338
		350·5	2·18	2·7	·54	20·6	4·54	38·9	·27	43·6	·36	1·1	...	19·0	·27	808·7	11·61	30·7
1908. Plains ...	98,138	27,893	51	272	32	1,210	214	1,720	26	4,724	28	140	...	1,144	12	67,837	653	2,201
		284·2	·52	2·8	·33	12·3	2·18	17·5	·26	48·1	·29	1·4	...	11·7	·12	691·2	6·65	22·4
Hills ...	23,465	5,545	22	92	20	364	60	582	11	1,054	8	48	...	352	3	14,660	232	550
		236·3	·94	3·9	·85	15·5	2·56	24·8	·47	44·9	·34	2·0	...	15·0	·13	624·8	9·89	23·4
Hills above 5,000 feet sea-level.	12,079	1,757	7	60	13	167	29	263	6	581	5	19	...	145	1	5,914	101	218
		145·5	·58	5·0	1·08	13·8	2·40	21·8	·50	48·1	·41	1·6	...	12·0	·08	489·6	8·36	18·0
Hills below 5,000 feet sea-level.	11,386	3,788	15	32	7	197	31	319	5	473	3	29	...	207	2	8,746	131	332
		332·7	1·32	2·8	·61	17·3	2·72	28·0	·44	41·5	·26	2·5	...	18·2	·18	768·1	11·51	29·2
1909. Plains ...	1,03,073	20,399	30	206	22	1,228	186	1,898	19	4,265	20	118	2	1,187	4	62,981	538	2,119
		197·9	·29	2·0	·21	11·9	1·80	18·4	·18	41·4	·19	1·1	·02	11·5	·04	611·0	5·22	20·6
Hills ...	24,735	3,067	6	86	29	308	61	612	7	718	3	54	...	249	2	11,894	192	501
		124·0	·24	3·5	1·17	12·5	2·47	24·7	·28	29·0	·12	2·2	...	10·1	·08	481·0	7·76	20·3
Hills above 5,000 feet sea-level.	13,223	1,054	4	49	15	130	32	314	3	383	2	17	...	106	...	5,269	100	227
		79·7	·30	3·7	1·13	9·8	2·42	23·7	·23	29·0	·15	1·3	...	8·0	...	398·5	7·56	17·2
Hills below 5,000 feet sea-level.	11,512	2,013	2	37	14	178	29	298	4	335	1	37	...	143	2	6,625	92	274
		174·9	·17	3·2	1·22	15·5	2·52	25·9	·35	29·1	·09	3·2	...	12·4	·17	575·5	7·99	23·8

PRISONERS.

TABLE XIV.—SUMMARY, SICKNESS AND MORTALITY.

A.—ADMINISTRATIONS.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH.* Admissions.	Constantly sick.	DEATHS FROM Cholera.	Small-pox.	Malaria.	Tubercle of the lungs.	Pneumonia.	Respiratory Diseases.	Dysentery.	Diarrhœa.	Anæmia and debility.	All causes.
Burma	1901-1905	11,779	452	22	·68	·02	·61	3·63	1·32	·51	1·77	·82	·32	16·78
	1908	13,871	277	16	·79	...	·50	3·39	1·23	·43	1·37	·14	·14	13·27
	1909	13,680	310	16	2·34	...	·29	4·24	·66	·29	1·68	·51	·22	16·15
Eastern Bengal and Assam ...	1901-1905	6,285	1,099	45	·67	·10	2·23	3·34	3·47	·76	7·67	1·05	1·46	28·07
	1908	7,118	917	37	1·97	·14	1·26	4·50	3·23	1·97	8·43	1·26	1·26	31·89
	1909	7,173	899	37	1·53	·14	2·79	3·62	4·04	1·39	8·09	·28	1·12	29·97
Bengal	1901-1905	14 573	909	37	·77	·04	2·03	3·86	2·48	·54	5·83	1·36	·56	23·93
	1908	15,565	930	38	3·98	·06	·84	5·01	2·31	·45	8·54	1·80	·96	31·61
	1909	16,936	916	40	·19	·06	2·06	4·24	2·68	·87	6·42	·87	·75	25·13
United Provinces of Agra and Oudh ...	1901-1905	25,557	699	34	·46	·04	·96	2·97	2·54	·94	3·73	1·06	·22	18·77
	1908	28,308	679	31	·21	·32	1·55	2·79	4·91	1·38	3·89	1·27	·46	24·09
	1909	26,020	574	28	1·00	...	1·23	3·31	5·50	·96	4·27	1·96	·31	23·79
Punjab	1901-1905	12,333	999	32	·11	·10	·97	3·68	4·74	·66	2·61	·75	·68	21·68
	1908	11,919	581	26	·08	·17	·42	5·87	4·53	·84	3·78	1·09	·42	23·49
	1909	11,526	613	28	·09	...	·26	5·47	6·16	1·13	1·91	2·08	·52	25·16
North-West Frontier Province ...	1901-1905	1,287	1,016	32	...	·78	·62	·93	4·35	·47	3·73	·47	·31	20·35
	1908	1,345	1,222	37	...	...	1·49	·74	4·46	2·23	·74	...	...	15·61
	1909	1,354	1,021	27	...	...	1·48	2·95	4·43	1·48	2·22	...	...	20·68
Central Provinces	1901-1905	4,129	772	25	·09	...	·54	2·53	2·48	1·31	3·61	1·85	1·17	20·19
	1908	4,013	632	21	...	·50	1·00	3·99	1·00	1·50	5·23	·50	...	22·18
	1909	4,297	514	18	...	...	1·16	1·63	·93	1·63	3·72	...	·23	15·59
Bombay	1901-1905	8,725	689	29	·05	·16	1·40	3·32	6·56	1·60	1·74	1·63	·83	26·36
	1908	7,930	654	33	·13	...	1·26	3·03	3·28	1·13	·88	·63	·25	18·16
	1909	7,591	580	28	...	...	1·32	1·98	3·16	·66	1·98	·66	1·05	17·92
Madras	1901-1905	9,832	482	21	1·36	·02	1·04	3·50	1·95	·33	2·36	·14	·37	18·74
	1908	10,038	443	23	7·05	...	1·03	3·20	1·88	·76	7·05	...	·94	29·80
	1909	10,815	497	25	3·51	...	·83	3·88	1·94	·09	5·92	...	1·20	25·24
INDIA†	1901-1905	95,479	759	31	·54	·06	1·17	3·32	3·07	·79	3·71	1·04	·56	21·12
	1908	101,336	645	29	1·68	·15	1·04	3·76	3·24	1·03	4·67	·94	·55	24·17
	1909	99,104	618	28	1·12	·02	1·19	3·72	3·60	·84	4·20	1·04	·60	23·85
ANDAMANS	1901-1905	13,289	1,838	61	...	...	3·76	7·66	4·23	1·28	10·84	1·57	·02	37·38
	1908	14,067	1,439	79	...	...	2·20	7·11	4·12	1·07	4·34	·71	...	26·66
	1909	13,145	1,761	94	...	...	4·56	7·00	6·24	1·45	8·98	·61	...	41·38
INDIA¶	1901-1905	108,769	891	35	·47	·06	1·57	3·85	3·21	·85	4·58	1·11	·49	23·11
	1908	115,403	743	35	1·47	·13	1·18	4·17	3·34	1·03	4·63	·91	·49	24·47
	1909	112,249	752	36	·99	·02	1·59	4·11	3·91	·91	4·76	·99	·53	25·02

* Excluding Subsidiary Jails. † Including Ajmer, Sibi, Quetta, Mercara and Secunderabad and excluding Andamans. ¶ Including Andamans.

B.—GROUPS.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH.* Admissions.	Constantly sick.	ADMISSIONS FROM Influenza.	Cholera.	Small-pox.	Enteric fever.	Malaria.	Pyrexia of uncertain origin.	Pneumonia.	Dysentery.	Diarrhœa.
Group I.—Burma Coast and Bay islands ...	1901-1905	7,967	442	21	·7	1·2	·1	·6	100·2	19·2	3·8	37·0	25·2
	1908	9,542	271	15	·6	·3	...	·8	33·4	16·8	2·0	14·0	11·8
	1909	9,552	326	17	...	·9	...	·5	40·6	22·4	2·4	20·0	9·8
,, II.—Burma Inland	1901-1905	3,812	471	23	4·2	1·8	·1	·6	110·2	3·0	8·0	67·7	39·1
	1908	4,329	291	16	·7	3·2	...	3·0	49·4	15·7	7·2	31·2	11·1
	1909	4,128	272	13	...	9·2	...	1·5	23·7	23·7	1·7	21·6	17·9
,, III.—Assam	1901-1905	1,239	820	42	19·2	1·5	1·1	·2	263·9	4·4	4·8	234·2	56·7
	1908	1,532	1,138	27	...	2·6	·7	...	627·3	...	7·8	91·4	92·7
	1909	1,416	1,261	33	4·9	1·4	·7	·7	582·6	1·4	14·1	81·2	218·2
,, IV.—Bengal and Orissa	1901-1905	12,182	1,014	40	21·2	1·1	·4	·5	272·4	10·8	10·3	258·9	78·3
	1908	12,984	957	42	18·0	5·5	·5	3·1	251·5	5·6	9·9	196·0	89·3
	1909	13,271	874	41	3·1	1·1	1·4	1·4	222·8	7·9	13·6	176·1	76·8
,, V.—Gangetic plain and Chutia Nagpur ...	1901-1905	23,686	769	33	16·0	·9	·4	·4	265·5	4·5	10·0	86·0	50·1
	1908	26,317	661	29	2·5	3·0	2·6	·2	204·8	11·3	11·7	86·8	40·2
	1909	25,201	626	29	1·1	1·8	·8	1·3	188 4	7·0	14·7	78·3	42·5
,, VI.—Upper Sub-Himalaya	1901-1905	13,091	946	32	17·8	·1	·3	·8	410·5	3·9	17·5	56·3	54·5
	1908	13,349	771	30	7·3	·1	2·1	·9	351·6	7·6	25·7	62·0	25·8
	1909	12,599	734	31	1·3	·2	·2	·2	283·8	5·3	31·9	47·5	33·6
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1901-1905	8,142	785	29	9·5	·3	1·7	·2	292·4	1·1	27·4	48·5	49·1
	1908	8,293	650	28	1·0	·5	1·0	·5	203·9	4·2	22·7	47·8	31·4
	1909	7,928	641	30	5·2	...	·5	·5	190·2	2·5	23·0	51·3	30·4
,, VIII.—South-Western Rajputana, Central India and Gujarat.	1901-1905	4,772	754	39	12·3	·5	·8	·1	279·0	·3	20·5	36·5	31·2
	1908	4,666	580	37	...	·8	·2	1·1	193·3	...	19·1	25·7	29·4
	1909	4,299	479	25	...	...	...	...	137·9	·9	18·1	24·9	22·8
,, IX.—Deccan	1901-1905	8,373	812	31	14·0	·2	·3	·2	290·4	4·5	9·9	50·3	44·5
	1908	7,557	744	32	2·5	·8	·7	·5	210·3	9·0	4·2	50·8	49·4
	1909	7,769	629	26	1·0	...	·4	·5	154·8	2·6	5·1	35·9	37·2
,, X.—Western Coast...	1901-1905	2,728	527	23	1·4	·1	1·0	3·7	159·9	8·3	9·5	40·3	35·1
	1908	2,400	530	25	...	...	1·2	3·8	109·2	8·3	6·7	80·0	30·4
	1909	2,385	521	22	...	...	...	...	69·6	36·5	6·7	52·4	31·9
,, XI.—Southern India	1901-1905	8,845	497	22	4·4	3·6	·2	·7	107·7	26·8	9·0	55·1	5·8
	1908	9,636	433	23	·1	13·0	·1	1·2	69·1	13·4	8·5	58·7	5·9
	1909	9,901	471	25	·8	9·1	·1	1·0	81·9	27·7	8·5	67·0	6·2
,, XII.—Hills	1901-1905	504	842	28	5·1	1·3	1·0	2·4	270·0	19·9	20·2	85·5	50·5
	1908	666	868	27	...	40·5	...	...	184·7	...	16·5	91·6	61·6
	1909	584	1,099	35	...	...	...	1·7	352·7	5·1	32·5	123·3	113·0
INDIA†	1901-1905	95,479	759	31	12·7	1·0	·5	·6	254·0	8·4	12·4	88·3	45·8
	1908	101,336	646	29	4·2	3·3	1·2	2·1	197·7	9·4	12·4	76·9	37·6
	1909	99,104	618	28	1·5	2·0	·5	·9	172·3	10·8	14·3	70·2	38·6
ANDAMANS...	1901-1905	13,289	1,838	61	7·0	...	...	...	1,121·4	...	11·6	156·9	63·9
	1908	14,667	1,439	79	...	...	...	·2	856·5	9·5	10·2	110·8	33·5
	1909	13,145	1,761	94	·2	...	...	·5	1,075·4	53·0	18·2	149·4	25·3
INDIA ‡	1901-1905	108,769	891	35	12·0	·9	·4	·5	360·0	7·1	12·3	96·7	48·0
	1908	115,403	743	35	3·7	2·9	1·1	1·0	218·0	9·4	12·1	81·1	37·3
	1909	112,249	752	36	1·4	1·8	·4	·8	278·2	15·8	14·8	79·5	37·0

Excluding Subsidiary Jails. † Including Aden and excluding Andamans. ‡ The quinquennial ratios are, of course, worked on the total strength of the five years. § Including Andamans.

PRISONERS.

TABLE XV.—RATIOS OF ADMINISTRATIONS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.											
	Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces.	Punjab.	N.-W.F. Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH	13,680	7,173	16,036	26,020	11,526	1,354	4,297	7,591	10,815	99,104	13,145	112,249
II.—CONSTANTLY SICK RATE OF EACH MONTH—												
January	14·1	35·9	37·7	30·6	36·0	37·6	17·9	30·7	23·9	28·6	72·9	34·0
February	15·4	32·0	40·3	29·6	31·7	32·0	18·0	30·4	24·0	28·7	75·9	34·5
March	15·3	38·9	41·7	28·2	27·6	24·9	16·2	29·9	24·6	28·5	76·8	34·3
April	15·3	39·3	44·8	28·4	26·6	26·2	16·5	26·6	23·3	28·6	77·1	34·4
May	14·6	36·9	38·0	30·4	28·4	24·3	14·3	27·3	25·3	28·1	91·9	35·7
June	15·4	34·6	36·0	28·5	26·1	23·4	15·5	28·3	28·5	27·4	101·3	36·0
July	16·5	34·5	40·4	27·2	26·5	15·4	18·4	27·9	30·5	28·1	115·0	38·2
August	17·0	35·7	45·8	29·1	29·0	17·1	18·8	27·5	27·3	29·7	117·3	39·7
September	18·0	37·0	39·1	27·4	27·9	20·5	19·5	25·8	24·0	27·8	113·8	37·6
October	17·3	39·1	40·3	26·9	26·6	33·0	19·3	25·4	22·9	27·8	100·8	36·1
November	17·1	35·5	39·6	25·6	25·4	39·9	17·5	27·7	25·5	27·3	95·5	35·1
December	15·7	39·1	38·1	24·3	27·8	24·8	19·0	26·7	24·8	26·8	89·9	34·0
OF THE YEAR	16·0	36·6	40·2	28·0	27·8	26·5	17·6	27·8	25·4	28·1	93·9	35·8
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS.	...	34·8	38·5	...	27·8	27·0	17·4	25·4	23·2	27·3	...	34·7
III.—ADMISSION RATE OF THE YEAR—												
Influenza	...	4·6	·9	1·6	3·7	...	1·9	...	·7	1·5	·2	1·4
Cholera	3·4	2·2	·2	1·7	·2	...	...	...	8·3	2·0	...	1·8
Small pox	...	·6	1·4	·5	·5	...	·5	·1	·1	·5	...	·4
Enteric Fever	·8	1·4	1·6	·8	·2	2·2	·5	...	·9	·9	·5	·8
Malaria	35·5	247·9	273·8	212·1	139·3	504·4	151·3	123·8	81·0	172·3	1,075·4	278·1
Pyrexia of uncertain origin	22·8	13·4	2·8	5·7	7·3	...	2·1	3·0	32·5	10·8	53·8	15·8
Tubercle of the lungs	8·0	8·4	12·9	10·0	15·4	9·6	4·0	3·7	10·1	9·9	8·4	9·7
Pneumonia	2·2	15·8	10·0	22·4	23·9	24·4	6·3	13·0	8·0	14·3	18·2	14·8
Respiratory Diseases	12·4	26·2	32·7	19·4	29·2	30·3	12·1	28·1	25·2	23·3	56·5	27·2
Dysentery	26·5	200·2	151·5	40·0	38·9	99·0	29·6	38·2	69·0	70·2	149·4	79·5
Diarrhœa	12·3	94·2	90·8	21·9	37·7	13·3	34·7	34·4	7·7	38·6	25·3	37·0
Spleen Diseases	·1	...	...	·1	2·9	3·7	·9	·3	...	·6	...	·5
Scurvy	...	·8	·1	·1	·4	2·2	...	2·4	·1	·4	1·5	·5
Anæmia and Debility	3·1	17·4	10·7	7·9	20·8	10·3	8·8	13·2	20·7	11·8	...	10·4
Abscess, Ulcer, and Boil	55·0	46·7	57·7	72·	103·3	121·1	64·0	79·6	34·6	66·1	62·0	65·8
ALL CAUSES	309·9	899·9	916·0	573·7	612·7	1,021·4	514·3	580·2	496·6	617·0	1,761·3	751·8
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	895·2	901·0	...	611·6	1,072·4	514·0	627·2	545·0	627·6	...	753·7
IV.—DEATH RATE OF THE YEAR—												
Cholera	2·34	1·53	·19	1·00	·09	...	...	...	3·51	1·12	...	·99
Small-pox	...	·14	·06	...	...	...	...	...	...	·02	...	·02
Enteric Fever	·15	·56	·56	·08	...	...	·23	...	·28	·21	·08	·20
Malaria	·29	2·79	2·06	1·23	·26	1·48	1·16	1·32	·83	1·19	4·56	1·59
Pyrexia of uncertain origin	...	...	·06	...	·09	...	...	...	...	·02	...	·02
Tubercle of the lungs	4·24	3·62	4·24	3·31	5·47	2·95	1·63	1·98	3·88	3·72	7·00	4·11
Pneumonia	·66	4·04	2·68	5·50	6·16	4·43	·93	3·16	1·94	3·60	6·24	3·91
Respiratory Diseases	·29	1·39	·87	·96	1·13	1·48	1·63	·66	·09	·84	1·45	·91
Dysentery	1·68	8·09	6·42	4·27	1·91	2·22	3·72	1·98	5·92	4·20	8·98	4·76
Diarrhœa	·51	·28	·87	1·96	2·08	...	..	·66	...	1·04	·61	·99
Hepatic Abscess	...	·28	...	·12	...	...	..	...	...	·05	·15	·06
Anæmia and Debility	·22	1·12	·75	·31	·52	...	·23	1·05	1·20	·60	...	·53
Phagedæna, Slough, and Gangrene	...	...	...	·15	...	...	...	...	...	·04	·15	·05
ALL CAUSES	16·15	29·97	25·13	23·79	25·16	20·68	15·59	17·92	25·24	22·85	41·38	25·02
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS—	...	28·63	24·61	...	24·84	19·87	15·58	17·25	23·24	22·38	...	24·49
V.—PERCENTAGE IN 100 ADMISSIONS—												
Influenza	...	5·1	·10	·28	·61	...	·36	...	·15	·24	·01	·18
Cholera	1·11	·25	·02	·29	·03	...	...	...	1·68	·33	...	·24
Small-pox	...	·06	·16	·09	·08	...	·09	·02	·02	·08	...	·06
Enteric Fever	·26	·16	·18	·15	·03	·22	·09	...	·19	·14	·03	·11
Malaria	11·46	27·57	29·89	36·97	22·74	49·39	29·41	21·34	16·13	27·90	61·06	36·99
Pyrexia of uncertain origin	7·36	1·49	·31	·99	1·19	...	·41	·52	6·55	1·75	3·05	2·11
Tubercle of the lungs	2·59	·93	1·41	1·75	2·51	·94	·77	·64	2·03	1·60	·48	1·29
Pneumonia	·71	1·75	1·09	3·91	3·91	2·39	1·22	2·25	1·62	2·32	1·03	1·97
Respiratory Diseases	4·01	2·92	3·57	3·39	4·77	2·96	2·35	4·84	5·08	3·77	3·21	3·62
Dysentery	6·60	22·27	16·54	6·97	6·34	9·69	5·75	6·58	13·89	11·36	8·48	10·57
Diarrahœa	3·96	10·48	9·91	3·81	6·15	1·30	6·74	5·93	1·55	6·24	1·44	4·92
Spleen Diseases	·02	...	...	·02	·48	·36	·18	·05	...	·09	...	·06
Scurvy	...	·09	·01	·01	·07	·22	...	·41	·02	·06	·09	·07
Anæmia and Debility	1·01	1·94	1·17	1·37	3·40	1·01	1·72	2·27	4·17	1·90	...	1·38
Abscess, Ulcer, and Boil	17·74	5·19	6·30	12·55	16·86	11·86	12·44	13·71	6·96	10·70	3·52	8·73
IV.—PERCENTAGE IN 100 DEATHS—												
Cholera	14·5	5·1	·7	4·2	·3	...	...	...	13·9	4·9	...	4·0
Small-pox	...	·5	·2	...	...	...	...	...	...	·1	...	·1
Enteric Fever	·9	1·9	2·2	·3	...	...	1·5	...	1·1	·9	·2	·8
Malaria	1·8	9·3	8·2	5·2	1·0	7·1	7·5	7·4	3·3	5·2	11·0	6·3
Pyrexia of uncertain origin	...	...	·2	...	·3	...	...	...	...	·1	...	·1
Tubercle of the lungs	26·2	12·1	16·9	13·9	21·7	14·3	10·4	11·0	15·4	16·3	16·9	16·4
Pneumonia	4·1	13·5	10·7	23·1	24·5	21·4	6·0	17·6	7·7	15·8	15·1	15·6
Respiratory Diseases	1·8	4·7	3·5	4·0	4·5	7·1	10·4	3·7	·4	3·7	3·5	3·6
Dysentery	10·4	27·0	25·6	17·9	7·6	10·7	23·9	11·0	23·4	18·4	21·7	19·0
Diarrhœa	3·2	·9	3·5	8·2	8·3	...	...	3·7	...	4·5	1·5	4·0
Hepatic Abscess	...	·9	...	·5	...	...	...	...	...	·2	·4	·2
Anæmia and Debility	1	3·7	3·0	1·3	2·1	...	1·5	5·9	4·8	2·6	...	2·1
Phagedæna, Slough, and Gangrene	...	...	...	·6	...	...	...	...	...	·2	·4	·2

* Including Ajmer, Sibi, Quetta, Secunderabad Mercara and excluding Andamans.
† Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and Andamans.

PRISONERS.

TABLE XVI.—RATIOS OF GEOGRAPHICAL GROUPS.

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I. Burma Coast and Bay Islands.	II. Burma Inland.	III. Assam.	IV. Bengal and Orissa.	V. Gangetic Plain and Chutia Nagpur.	VI. Upper Sub-Himalaya.	VII. N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII. S.-E. Rajputana, Central India, and Gujarat.	IX. Deccan.	X. Western Coast.	XI. Southern India.	XII. Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH ...	9,552	4,128	1,416	13,271	25,201	12,599	7,928	4,299	7,769	2,385	9,901	584	99,104
II.—CONSTANTLY SICK RATE OF EACH MONTH—													
January	15·6	10·7	29·1	39·2	29·0	32·5	34·2	35·1	28·3	18·6	23·9	27·8	28·6
February	17·3	11·2	24·2	40·5	30·2	29·5	34·5	33·2	27·5	19·9	23·8	29·6	28·7
March	17·2	11·3	29·0	42·6	30·7	27·8	30·2	30·7	26·2	18·1	24·7	31·1	28·5
April	17·6	10·2	34·9	41·0	33·0	29·0	28·0	30·4	24·4	18·8	23·1	28·0	28·6
May	16·5	10·1	39·6	38·8	39·1	33·4	28·1	27·3	22·9	22·3	24·8	29·5	28·1
June	16·9	12·0	43·9	36·0	27·9	31·9	29·2	19·3	24·3	27·4	27·1	38·3	27·4
July	16·4	16·7	44·1	39·2	27·9	31·4	27·0	18·2	27·0	28·3	28·9	43·5	28·1
August	17·1	16·7	32·7	42·2	30·4	35·9	29·9	19·4	27·0	24·2	26·7	39·7	29·7
September	19·9	13·5	33·3	40·0	27·3	34·9	27·6	17·6	26·4	16·5	24·3	32·3	27·8
October	18·0	15·5	35·3	42·3	28·0	32·0	27·4	18·0	26·8	18·6	22·6	46·4	27·8
November	17·8	15·3	26·5	48·6	25·2	27·7	29·9	26·4	25·9	23·5	24·7	37·0	27·3
December	16·9	12·7	28·4	44·3	23·6	27·9	30·0	28·4	24·7	24·1	23·9	31·1	26·8
OF THE YEAR ...	17·3	13·0	33·3	40·8	28·6	31·2	29·7	25·2	25·9	21·7	24·9	34·9	28·1
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	4·9	3·1	1·1	1·3	5·2	...	1·0	...	·8	...	1·5
Cholera	·9	9·2	1·4	1·8	·2	...	...	...	...	...	9·1	...	2·0
Small-pox	...	...	·7	1·4	·8	·2	·5	...	·4	...	·1	...	·5
Enteric Fever	·5	1·5	·7	1·4	1·3	·2	·5	...	·5	...	1·0	1·7	·9
Malaria	40·6	23·7	582·6	222·8	188·4	283·8	190·8	137·9	154·8	69·6	81·9	352·7	172·4
Pyrexia of uncertain origin ...	22·4	28·7	1·4	7·9	7·0	5·3	2·5	·9	2·6	36·5	27·7	5·1	10·8
Tubercle of the lungs ...	9·1	5·6	4·2	10·9	10·2	12·5	14·9	8·8	3·9	6·3	10·4	5·1	9·9
Pneumonia	2·4	1·7	14·1	13·6	14·7	31·9	23·0	18·1	5·1	6·7	8·5	32·5	14·3
Respiratory Diseases	12·7	11·9	28·2	32·8	21·3	21·7	34·4	21·9	19·1	32·7	24·1	42·8	23·3
Dysentery	20·0	21·6	81·2	176·1	78·3	47·5	51·3	24·9	35·9	52·4	67·0	123·3	70·2
Diarrhœa	9·8	17·9	218·2	76·8	42·5	33·6	30·4	22·8	37·2	31·9	6·2	113·0	38·6
Spleen Diseases	...	·2	...	...	·1	1·6	2·6	·2	·5	...	...	6·8	·5
Scurvy	...	...	2·8	·2	·1	·1	2·8	...	·4	...	·1	1·7	·4
Anæmia and Debility	3·6	2·2	25·4	15·2	7·0	17·2	18·2	6·5	9·8	20·1	19·0	12·0	11·8
Abscess, Ulcer, and Boil ...	60·3	42·6	49·4	55·8	66·4	99·2	85·6	43·0	95·0	36·1	32·6	89·0	66·1
ALL CAUSES ...	326·3	272·0	1,260·6	873·6	626·0	734·3	641·0	479·4	629·0	521·2	471·2	1,099·3	617·9
IV.—DEATH RATE OF THE YEAR—													
Cholera	·31	7·03	1·41	·68	1·15	·08	...	...	...	...	3·84	...	1·12
Small-pox	...	...	...	·08	·04	...	...	...	...	...	...	...	·02
Enteric Fever	·10	·24	...	·45	·24	·16	...	...	·13	...	·30	1·71	·21
Malaria	·31	·24	6·36	2·19	1·39	·87	·63	1·40	1·16	2·10	·40	1·71	1·19
Pyrexia of uncertain origin ...	...	...	...	...	·04	...	·13	...	...	...	...	...	·02
Tubercle of the lungs	5·23	1·94	1·41	3·54	3·77	3·89	5·17	3·26	1·67	4·61	3·94	...	3·72
Pneumonia	·73	·48	4·24	3·32	3·17	8·65	5·30	5·82	1·16	2·52	2·02	11·99	3·60
Respiratory Diseases	·42	...	·71	1·36	·87	1·11	1·01	·93	·90	1·26	·10	1·71	·84
Dysentery	1·78	1·45	7·77	5·05	5·95	3·41	2·65	1·86	2·19	2·94	6·16	13·70	4·20
Diarrhœa	·21	1·21	·71	·45	1·55	2·38	1·39	1·63	...	·42	...	1·71	1·04
Hepatic Abscess	...	...	...	·15	·08	·08	...	...	...	...	...	...	·05
Anæmia and Debility ...	·21	·24	3·53	·83	·32	·32	·38	·93	·77	·84	1·21	1·71	·60
Phagedæna, Slough and Gangrene	...	...	...	...	·08	·16	...	...	...	...	...	...	·04
ALL CAUSES ...	15·91	16·72	32·49	23·74	24·05	27·86	25·10	20·24	14·42	23·90	24·95	41·10	22·85
V.—PERCENTAGE IN 100 ADMISSIONS—													
Influenza	...	...	·39	·35	·17	·18	·81	...	·16	...	·17	...	·24
Cholera	·29	3·38	·11	·12	·29	·02	...	...	...	...	1·93	...	·33
Small-pox	...	...	·06	·16	·13	·02	·08	...	·06	...	·02	...	·08
Enteric Fever	·16	·53	·06	·16	·22	·03	·08	...	·08	...	·21	·16	·14
Malaria	12·45	8·73	46·22	25·51	30·09	38·66	29·67	28·77	24·62	13·35	17·38	32·09	27·90
Pyrexia of uncertain origin ...	6·87	8·73	·11	·91	1·12	·72	·39	·19	·42	7·00	5·87	·47	1·75
Tubercle of the lungs	2·79	2·05	·34	1·25	1·63	1·70	2·32	1·84	·62	1·21	2·21	·47	1·60
Pneumonia	·74	·62	1·12	1·56	2·35	4·35	3·58	3·78	·83	1·29	1·80	2·96	2·32
Respiratory Diseases	3·88	4·36	2·24	3·75	3·40	2·95	5·37	4·56	3·03	6·28	5·12	3·89	3·77
Dysentery	6·13	7·93	6·44	20·16	12·51	6·46	8·01	5·19	5·71	10·06	14·21	11·21	11·36
Diarrhœa	3·02	6·59	17·31	8·79	6·79	4·57	4·74	4·75	5·91	6·11	1·31	10·28	6·24
Spleen Diseases	...	·09	...	...	·01	·22	·41	·05	·08	...	...	·62	·09
Scurvy	...	...	·22	·03	·02	·01	·43	...	·06	...	·02	·16	·06
Anæmia and Debility	1·09	·80	2·02	1·74	1·12	2·35	2·83	1·36	1·57	3·86	4·03	1·09	1·90
Abscess, Ulcer, and Boil ...	18·48	15·67	3·92	6·38	10·61	13·51	13·37	8·98	15·10	6·92	6·92	8·10	10·70
IV.—PERCENTAGE IN 100 DEATHS—													
Cholera	2·0	42·0	4·3	2·9	4·8	·3	...	...	...	...	15·4	...	4·9
Small-pox	...	...	·3	·2	...	...	...	...	...	...	...	...	·1
Enteric Fever	·7	1·4	...	1·9	1·0	·6	...	...	·9	...	1·2	4·2	·9
Malaria	2·0	1·4	19·6	9·2	5·8	3·1	2·5	6·9	8·0	8·8	1·6	4·2	5·2
Pyrexia of uncertain origin ...	...	...	...	...	·2	...	·5	...	...	...	...	...	·1
Tubercle of the lungs	32·9	11·6	4·3	14·9	15·7	13·7	20·6	16·1	11·6	19·3	15·8	...	16·3
Pneumonia	4·6	2·9	13·0	14·0	13·2	31·1	21·1	28·7	8·0	10·5	8·1	29·2	15·8
Respiratory Diseases	2·6	...	2·2	5·7	3·6	4·0	4·6	4·6	6·2	5·3	·4	4·2	3·7
Dysentery	11·2	8·7	23·9	21·3	24·8	12·3	10·6	9·2	15·2	12·3	24·7	33·3	18·4
Diarrhœa	1·3	7·2	2·2	1·9	6·4	8·5	5·5	8·0	...	1·8	...	4·2	4·5
Hepatic Abscess	...	...	...	·6	·3	·3	...	...	...	...	...	...	·2
Anæmia and Debility	1·3	1·4	10·9	3·5	1·3	1·1	1·5	4·6	5·4	3·5	4·9	4·2	2·6
Phagedæna, Slough and Gangrene	...	...	...	...	·3	·6	...	...	...	...	...	...	·2

* Including Aden.

GENERAL POPULATION.

TABLE XVII.—PROVINCIAL BIRTH AND DEATH STATISTICS.

Province.	Year.	Births.			Number of Deaths.			Ratio of deaths per 1,000 of population.			Highest Death-rate.		Lowest Death-rate.		Mean death rate during previous five years.			Number of deaths of males to every 100 deaths of females.
		Total number.	Ratio per 1,000 of population.	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Bengal ...	1908	1,823,716	30·09	38·90	100,134	1,848,379	1,948,513	31·20	39·06	38·56	94·25	68·38	6·58	26·93	37·26	35·41	35·53	109
	1909	1,909,547	37·79	38·40	92,186	1,451,785	1,543,971	28·66	30·68	30·55	65·49	44·42	4·06	19·34	35·73	36·43	36·39	108
Eastern Bengal and Assam.	1908	1,226,602	41·14	38·56	14,137	902,409	916,546	23·23	30·92	30·74	57·26	51·37	8·21	20·10	24·58	31·75	31·60	111
	1909	1,206,417	40·46	39·12	15,067	995,288	1,010,355	23·70	34·11	33·89	48·48	43·71	2·00	25·05	24·14	31·94	31·77	110
United Provinces of Agra and Oudh.	1908	1,786,702	37·46	43·09	165,121	2,349,640	2,514,761	49·20	53·60	52·73	114·53	81·22	18·68	37·43	52·38	39·38	40·30	102·84
	1909	1,589,196	33·32	41·35	126,364	1,654,705	1,781,069	37·56	37·33	37·34	67·63	49·17	16·44	25·79	51·25	42·15	42·79	107·37
Punjab ...	1908	840,061	41·8	42·6	111,973	908,152	1,020,125	55·58	50·19	50·73	121·43	84·35	5·80	19·21	49·58	48·86	48·93	102·8
	1909	705,910	35·1	42·4	68,317	552,766	621,083	34·62	30·48	30·89	73·32	38·16	4·11	17·06	50·36	49·16	49·28	110·9
North West Frontier Province.	1908	71,181	37·3	35·8	6,002	62,359	68,362	35·59	35·85	35·83	65·39	37·●	7·50	32·25	32·99	31·44	31·54	110·5
	1909	66,111	34·7	36·7	4,471	46,220	50,691	25·07	26·57	26·57	33·35	31·33	10·56	22·44	33·42	32·73	32·78	113·8
Central Provinces and Berar.	1908	633,575	52·84	51·26	46,567	410,514	457,081	37·74	38·16	38·12	70·85	42·59	18·14	32·60	49·35	36·57	37·91	110·05
	1909	617,987	51·63	53·01	48,687	347,448	396,135	39·30	32·38	33·09	89·78	42·52	15·72	25·13	43·96	37·82	38·44	112·49
Madras Presidency.	1908	1,192,136	32·4	31·1	137,291	823,628	960,919	33·3	25·3	26·2	70·8	37·8	2·8	13·8	29·4	22·8	23·6	104·5
	1909	1,215,717	33·1	31·4	112,711	688,855	801,566	26·4	21·2	21·8	55·2	27·2	2·0	16·0	30·4	23·5	24·4	105·0
Coorg ...	1908	4,365	24·17	24·75	767	5,544	6,311	50·30	33·53	34·94	83·12	38·85	27·50	28·21	40·08	28·79	29·74	124·11
	1909	4,981	27·58	24·28	704	4,380	5,084	46·17	26·49	28·15	62·10	37·05	29·85	18·38	40·38	29·53	30·44	124·46
Bombay Presidency.	1908	660,201	35·72	33·25	99,504	402,334	501,838	37·50	25·10	27·15	59·29	38·07	8·08	12·29	50·92	34·82	37·00	108·93
	1909	657,685	35·59	34·15	92,393	413,543	505,936	34·82	25·80	27·38	72·92	39·40	8·50	11·85	46·45	31·53	33·65	109·45
Lower Burma	1908	189,667	34·06	33·12	30,307	126,052	156,359	42·56	25·94	28·06	75·90	33·18	20·18	18·74	36·49	23·33	25·06	126
	1909	196,179	35·27	33·22	28,209	125,860	154,069	39·97	25·92	27·70	63·54	37·72	22·14	18·87	39·17	23·92	29·85	125
Upper Burma	1908	105,960	36·32	...	12,795	70,405	83,200	38·80	27·21	28·52	61·31	43·85	19·60	18·10	39·45	21·17	23·09	101
	1909	110,628	37·10	...	15,680	88,113	103,793	47·55	33·22	34·81	70·55	54·51	29·74	26·19	39·36	22·64	24·42	102
Ajmer-Merwara.	1908	20,261	42·48	32·09	5,819	12,274	19,093	52·60	35·34	40·03	90·37	55·23	36·77	23·89	42·77	25·90	30·49	103·68
	1909	18,021	37·78	34·69	9,378	14,914	24,292	72·34	42·95	50·94	124·28	104·89	35·73	21·61	45·09	28·13	32·74	108·16

GENERAL POPULATION.

TABLE XVIII.—BIRTHS.

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Bengal	50,528,446	50·07	22·90	37·79	105	7·24	...
Eastern Bengal and Assam ...	29,812,735	52·01	26·62	40·46	106	6·57	...
United Provinces of Agra and Oudh	47,691,782	46·97	23·37	33·32	108·70	...	4·02
Punjab	20,108,690	68·9	19·4	35·1	110·0	4·2	...
North-West Frontier Province ...	1,908,184	42·0	28·7	34·7	121·4	7·6	...
Central Provinces and Berar ...	11,970,201	59·22	38·69	51·63	104·77	18·54	...
Madras Presidency	36,691,654	39·2	26·0	33·1	104·5	11·3	...
Coorg	180,607	38·43	20·22	27·58	100·52	...	·57
Bombay Presidency	18,481,362	54·36	14·65	35·59	107·98	8·21	...
Burma ... {Lower ...	5,561,944	47·45	20·24	35·27	107	8	...
Burma ... {Upper ...	2,981,809	42·80	29·83	37·10	105	2	...
Ajmer-Merwara	476,912	47·19	35·00	37·78	116·52	...	13·15

General Population.

Table XIX.—Deaths.

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of Deaths per 1,000 of population.			Death rate by Sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Bengal	50,528,446	110,469	457	42·15	19·41	30·55	32·01	29·11
Eastern Bengal and Assam.	29,812,735	71,555	416	43·29	24·89	33·89	34·89	32·85
United Provinces of Agra and Oudh.	47,691,782	107,164	445	49·08	26·63	37·34	37·46	37·22
Punjab	20,108,690	97,209	207	39·6	23·9	30·9	30·3	31·6
North-West Frontier Province.	1,908,184	13,688	149	30·2	24·5	26·6	26·5	26·7
Central Provinces and Berar.	11,970,201	99,803	120	45·06	25·11	33·09	35·39	30·84
Madras Presidency ...	36,691,654	129,372	284	38·3	17·2	21·8	22·7	21·0
Coorg	180,607	1,583	114	37·31	22·69	28·15	28·12	28·19
Bombay Presidency ...	18,481,362	122,984	150	35·95	14·85	27·38	27·74	26·98
Burma ... Lower ...	5,561,944	75,952	73	39·63	18·98	27·70	28·97	27·04
Burma ... Upper ...	2,981,809	32,885	91	53·95	26·71	34·81	36·94	32·88
Ajmer-Merwara ...	4,76,912	2,711	176	55·93	34·11	50·94	48·45	53·70

Table XX.—Deaths in Towns and Rural Circles compared.

Province.	Number of Registration Circles.			Population.			Ratio of Deaths per 1,000 of population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Bengal	402	129	531	47,312,029	3,216,417	50,528,446	30·68	28·66	30·55
Eastern Bengal and Assam.	242	54	296	29,177,017	635,718	29,812,735	34·11	23·70	33·89
United Provinces of Agra and Oudh.	782	424	1,206	44,327,536*	3,364,246	47,691,782*	37·33	37·56	37·34
Punjab	409	134	543	18,135,304	1,973,386	20,108,690	30·48	34·62	30·89
North-West Frontier Province.	66	12	78	1,739,531	178,316†	1,908,184	26·57	25·07	26·57
Central Provinces and Berar.	320	106	426	10,731,534	1,238,667	11,970,201	32·38	39·30	33·09
Madras Presidency ...	199	232	431	32,428,855	4,262,799	36,691,654	21·2	26·4	21·8
Coorg ...	5	5	10	165,358	15,249	180,607	26·49	46·17	28·15
Bombay Presidency...	224	65	289	16,027,055	2,653,369	18,481,362‡	25·80	34·82	27·38
Burma Lower ...	219	39	258	4,856,185	705,759	5,561,944	25·92	39·97	27·70
Burma Upper	121	17	138	2,652,040	329,769	2,981,809	33·22	47·55	34·81
Ajmer-Merwara ...	17	6	23	347,280	129,632	476,912	42·95	72·34	50·94

* Includes 16,010 persons enumerated at the Ajodhya fair.

† Includes a population of 9,663 in Nowshera Kalan (Notified area).

‡ The total excludes the increased population of Bombay city according to special census of 1906.

GENERAL POPULATION.

TABLE XXI.—DEATHS ACCORDING TO AGE.

Province.	Under one year.		Ratio per 1,000 of Population.																	
			1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Bengal ...	266·06	227·27	45·86	41·34	16·70	14·30	11·80	10·41	14·01	13·52	16·97	15·69	20·68	17·56	26·51	21·03	42·35	38·14	89·07	74·02
Eastern Bengal and Assam.	258·25	220·35	48·79	43·22	18·39	14·38	12·19	11·41	18·41	21·96	19·85	23·72	23·79	25·22	30·40	27·55	46·28	40·70	82·88	62·71
United Provinces of Agra and Oudh.	268·97	252·59	58·37	59·04	16·85	16·39	9·87	9·84	12·31	14·91	17·83	18·89	22·96	22·15	35·87	31·92	60·59	54·07	109·17	91·31
Punjab ...	246·83	245·92	46·45	47·98	11·48	12·60	8·47	11·15	10·66	11·30	12·90	14·37	16·15	17·89	25·13	23·44	36·72	34·65	83·66	80·92
North-West Frontier Province.	194·7	156·2	34·4	33·2	10·1	10·5	7·0	9·1	8·5	10·3	10·2	12·0	13·8	17·2	22·3	24·6	35·9	36·5	63·6	65·1
Central Provinces and Berar.	Information not available.																			
Madras Presidency.	209·8	170·7	26·8	25·3	7·7	7·2	5·5	5·7	8·5	11·5	10·8	11·2	12·2	11·4	18·0	13·8	29·0	23·6	70·5	65·0
Coorg ...	211·08	187·37	38·18	27·84	7·74	8·99	6·65	7·22	12·21	14·20	19·54	25·02	27·70	27·11	34·77	27·29	45·80	44·14	77·46	70·34
Bombay Presidency.	308·56	270·15	47·28	46·30	10·12	10·14	7·54	8·58	12·03	14·13	14·24	15·71	16·50	16·07	23·90	18·02	36·39	28·82	84·51	74·73
Burma { Lower	369·93	276·05	29·70	27·08	13·18	12·14	9·50	8·47	13·65	11·54	14·80	14·31	19·02	19·37	26·55	22·81	32·88	27·34	76·71	72·19
Burma { Upper	381·34	281·81	44·41	41·92	18·40	16·67	11·29	10·56	15·55	13·20	15·67	16·38	20·42	20·16	25·60	19·62	36·31	27·57	91·65	80·57
Ajmer-Merwara.	259·82	270·01	105·84	109·47	22·09	24·23	16·49	21·18	22·27	32·92	29·80	36·68	36·53	40·00	45·80	41·60	76·88	75·95	122·36	121·03
Total ...	260·72*	226·57*	45·28	43·00	14·29	12·93	9·53	9·39	12·72	14·66	15·91	16·96	19·36	18·48	27·44	23·15	43·51	38·19	88·07	75·97

NOTE.—The total ratios under the age periods "1—5" to "60 years and upwards" exclude Central Provinces and Berar for which the age distribution of the population is not known.

* Calculated on the number of births during 1909.

TABLE XXII.—DEATHS ACCORDING TO CAUSE.

Province.	Deaths per 1,000 of Population in 1909.								All causes.	Ratio of deaths in 1908.	Ratio of deaths in 1907.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Bengal	1·12	·76	·23	20·90	·71	·29	·53	5·98	30·55	38·56	37·72
Eastern Bengal and Assam ...	2·40	·79	·00003	24·56	·87	·15	·38	4·69	33·89	30·74	29·30
United Provinces of Agra and Oudh ...	·46	·12	·80	30·94	·30	·34	·52	3·86	37·34	52·73	43·46
Punjab	·08	·17	1·77	20·40	·52	2·22	·35	5·38	30·89	50·73	62·10
North-West Frontier Province ...	·07	·32	·001	20·65	·21	·85	·40	4·06	26·57	35·83	35·12
Central Provinces and Berar ...	·64	·35	1·61	15·08	2·79	2·60	·57	9·45	33·09	38·12	41·70
Madras Presidency	1·1	·5	·1	7·3	1·3	·8	·3	10·4	21·8	26·2	24·3
Coorg	·55	·03	·01	22·77	1·04	·33	·12	3·31	28·15	34·94	35·15
Bombay Presidency	1·55	·27	1·32	12·11	1·90	2·89	·38	6·95	27·38	27·15	32·82
Burma { Lower	·73	·15	·61	9·44	1·65	1·01	·35	13·77	27·70	28·06	26·84
Burma { Upper	2·46	·06	1·20	9·47	1·08	·72	·40	19·41	34·81	28·52	26·13
Ajmer-Merwara	...	·03	10·85	33·15	1·13	·48	·50	4·80	50·94	40·03	29·63

General Population.

Table XXIII.—Total number of deaths by months.

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1909.	1908.
Bengal ...	99,104	96,808	141,672	119,989	122,006	117,155	112,629	132,481	132,530	132,893	183,960	152,744	1,543,971	30·55	38·56
Eastern Bengal and Assam.	72,774	63,898	91,224	97,545	95,909	80,226	68,667	71,482	65,589	70,153	116,343	116,545	1,010,355	33·89	30·74
United Provinces of Agra and Oudh.	189,567	135,379	135,010	144,238	130,129	113,378	104,285	131,611	159,436	179,409	173,051	185,576	1,781,069	37·34	52·73
Punjab ...	68,676	49,463	51,212	49,468	51,128	42,022	32,492	37,831	47,225	62,159	65,231	64,176	621,083	30·89	50·73
North-West Frontier Province.	6,318	4,623	4,417	3,445	3,907	3,561	3,582	3,305	3,052	4,272	4,696	5,513	50,691	26·57	35·83
Central Provinces and Berar.	27,839	26,615	27,754	25,468	29,940	26,276	29,535	38,025	43,274	45,305	40,033	36,071	396,135	33·09	38·12
Madras Presidency.	77,267	64,568	64,491	56,533	60,087	60,653	65,446	65,726	69,458	71,275	70,624	75,438	801,566	21·8	26·2
Coorg ...	385	387	39	381	477	433	507	477	424	392	426	397	5,084	28·15	34·94
Bombay Presidency.	40,336	37,900	42,801	47,068	43,993	39,166	44,309	45,945	42,107	41,518	41,102	39,691	505,936	27·38	27·15
Burma { Lower ...	10,963	10,521	10,195	11,225	10,617	11,601	14,766	15,562	14,235	14,047	14,932	15,405	154,069	27·70	28·06
Burma { Upper ...	7,701	6,687	7,074	6,218	7,075	8,094	11,544	10,869	9,573	9,007	9,858	10,093	103,793	34·81	28·52
Ajmer-Merwara.	1,744	1,334	1,344	1,408	1,236	862	871	1,445	2,793	4,133	3,810	3,312	24,292	50·94	40·03
Total ...	602,674	498,183	577,592	562,986	556,504	503,427	488,633	554,759	589,695	634,563	724,066	704,961	6,998,044	30·91	38·11

Table XXIV.—Ratio of Deaths from all causes according to months.

Province.	†Annual death rate per mille for the month of— January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Rate for the year.
Bengal	23·09	24·98	33·01	28·89	28·43	28·21	26·24	30·87	31·91	30·97	44·30	35·59	30·55
Eastern Bengal and Assam	28·74	27·94	36·03	39·81	37·88	32·74	27·12	28·23	26·77	27·71	47·48	46·03	33·89
United Provinces of Agra and Oudh ...	46·80	37·00	33·33	36·80	32·13	28·92	25·75	32·49	40·67	44·29	44·15	45·82	37·34
Punjab	40·21	32·07	29·99	29·93	29·93	25·43	19·02	22·15	28·57	36·40	39·47	37·58	30·89
North-West Frontier Province ...	38·98	31·58	27·25	21·97	24·11	22·71	22·10	20·39	19·46	26·36	29·94	34·02	26·57
Central Provinces and Berar	27·38	28·98	27·30	25·89	29·45	26·71	29·05	37·40	43·98	44·56	40·69	35·48	33·09
Madras Presidency	24·79	22·94	20·69	18·75	19·28	20·11	21·00	21·09	23·03	22·87	23·42	24·21	21·8
Coorg	25·10	27·93	25·95	25·67	31·10	29·17	33·05	31·10	28·56	25·56	28·70	25·88	28·15
Bombay Presidency	25·70	26·73	27·27	30·99	28·03	25·78	28·23	29·27	27·72	26·45	27·06	25·29	27·38
Burma ... { Lower	23·21	24·66	21·58	24·55	22·48	25·38	31·26	32·94	31·14	29·74	32·66	32·61	27·70
Burma ... { Upper	30·41	29·23	27·93	25·37	27·94	33·03	45·58	42·92	39·06	35·57	40·22	39·85	34·81
Ajmer-Merwara	43·06	36·46	33·18	35·92	30·51	21·99	21·50	35·67	71·25	102·04	97·20	81·77	50·94
India ...	31·34	28·69	30·04	30·26	28·94	27·05	25·41	28·83	31·69	33·00	38·91	36·66	30·91

† The ratios in this statement have been calculated with reference to the number of days in each month

TABLE XXV.—DEATHS FROM CHOLERA IN THE DIFFERENT PROVINCES IN INDIA FROM 1889 TO 1909.

YEAR.	* Bengal.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.-W. Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1889	171,103	18,288	48,494	2,838	...	52,588	10,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	145,885	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	229,575	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	259,398	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	126,976	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	236,150	13,497	178,079	113	...	7,043	3,452	42,289	8	33,588	7,428	...	...	2	5,219	1,862	328
1895	177,087	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,649	6,043	467	2,334
1896	226,824	17,042	69,140	5,146	...	52,985	12,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	196,247	33,240	44,208	622	...	57,134	10,122	143,445	106	57,109	8,538	...	19	1,496	13,202	1,039	4,248
1898	65,020	11,149	2,508	33§	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	167,678	8,380	8,142	1,816	...	761‖	541	29,082	...	8,579	4,942	2,050	1	498	...	...	123
1900	345,878	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	110,753	7,468	53,995	180	117	49	17	81,370	58	13,600	3,552	‡	50	6	72	1	11,351
1902	150,971	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	203,405	8,360	47,159	14,688	1,354	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	137,701	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	146,339	142,312**	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	192,596	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	205,702	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	413	1	4,972
1908	268,908	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,730	937	2,449
1909	56,711	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	403	1,421	164	1,629

* Excluding Calcutta from 1889 to 1892.
† Statistics from 1889 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1889-1900 included in the Punjab.

TABLE XXVI.—DEATHS FROM CHOLERA IN BRITISH PROVINCES, BY MONTHS, DURING THE YEAR 1909.

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1909.	1908.
Bengal ...	816	1,145	6,154	6,278	6,226	6,001	5,700	5,364	4,581	4,845	5,381	4,220	56,711	1·12	5·32
Eastern Bengal and Assam.	1,078	1,174	5,824	15,221	11,621	3,630	1,611	1,281	1,590	5,567	12,145	10,995	71,737	2·40	1·99
United Provinces of Agra and Oudh.	41	11	134	1,058	2,317	3,421	2,593	3,579	3,579	3,951	1,004	135	21,823	·46	1·75
Punjab ...	...	...	1	153	520	596	132	37	73	1	...	...	1,513	·08	·61
North-West Frontier Province.	...	...	...	1	1	5	2	124	1	...	...	...	134	·07	1·49
Central Provinces and Berar.	8	16	55	479	962	868	1,271	2,506	1,107	346	69	...	7,687	·64	·76
Madras Presidency.	9,319	5,547	5,148	2,358	1,696	1,997	2,128	2,118	2,514	2,350	2,072	2,177	39,424	1·1	3·9
Coorg ...	3	18	9	17	42	10	...	...	...	...	...	...	99	·55	·63
Bombay Presidency.	198	216	619	6,664	5,497	5,371	5,181	3,197	1,047	503	190	31	28,714	1·55	·09
Burma { Lower ...	109	251	343	645	670	399	360	270	224	252	260	258	4,041	·73	1·68
Burma { Upper ...	148	59	127	286	633	984	1,745	1,136	817	621	620	172	7,348	2·46	·88
Ajmer-Merwara	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	11,720	8,437	18,414	33,160	30,185	23,282	20,723	19,612	15,533	18,436	21,741	17,988	239,231	1·05	2·61

TABLE XXVII.—DETAILS OF THE DISTRIBUTION AND OCCURRENCE OF CHOLERA DURING THE YEAR 1909.

Province.	Mortality in 1909.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Bengal	1·12	3·54	2·01	1·06	7·19	3·92	19·97	April.
Eastern Bengal and Assam	2·40	3·01	2·58	2·40	10·40	5·14	6·09	April.
United Provinces of Agra and Oudh ...	·46	1·61	·64	·44	2·20	4·04	18·73	October.
Punjab	·08	·20	·11	·07	·56	·73	6·11	June.
North-West Frontier Province ...	·07	·36	·15	·06	·84	·51	4·09	August.
Central Provinces and Berar ...	·64	·95	·90	·61	2·53	2·13	15·23	August.
Madras Presidency	1·1	2·2	1·0	1·1	12·25	2·8	17·2	January.
Coorg	·55	·34	·33	·51	1·79	1·50	2·50	May.
Bombay Presidency	1·55	·80	1·57	1·53	9·63	5·20	24·15	April.
Burma { Lower	·73	1·03	1·47	·62	3·83	2·28	10·68	May.
Burma { Upper	2·46	·53	3·85	2·29	12·37	7·22	9·11	July.
Ajmer-Merwara	...	...	...	...	...	...	...	...

GENERAL POPULATION.

TABLE XXVIII.—SMALL-POX MORTALITY.

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months :—													
January	2,959	745	487	393	21	366	2,175	...	438	24	8	4	7,617
February	4,346	1,294	618	332	37	444	2,369	...	663	56	5	4	10,168
March	8,334	3,224	1,017	351	32	659	2,658	...	1,083	101	27	...	17,486
April	8,433	4,950	1,257	379	37	726	2,323	3	1,010	113	53	3	19,347
May	6,592	5,074	1,104	421	66	630	1,555	1	691	132	41	...	16,307
June	3,842	3,020	693	449	81	379	1,298	1	345	129	19	3	10,259
July	1,560	1,731	386	266	55	168	1,074	...	173	62	7	...	5,582
August	814	1,010	158	189	41	133	1,191	...	139	66	2	1	3,724
September	503	624	54	155	30	86	1,034	...	82	18	15	1	2,602
October	293	312	39	147	30	59	1,096	...	60	34	4	...	2,274
November	398	662	37	143	77	154	999	1	119	9	1	...	2,600
December	535	758	57	125	104	251	1,990	...	236	30	...	...	3,185
Total ...	38,609	23,604	5,907	3,352	611	4,155	18,862	6	5,019	834	177	16	101,152
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1909.	·76	·79	·12	·17	·32	·35	·5	·03	·27	·15	·06	·03	·45
Ratio per 1,000 of population, 1908...	·71	·31	1·26	1·42	·38	·75	·6	·21	·14	·13	·19	1·81	·75
Difference ...	+·05	+·48	−1·14	−1·25	−·06	+·40	−·1	−·18	+·13	+·02	−·13	−1·78	−·30
Mean ratio per 1,000 during 1904-1908.	·41	·25	·45	·67	·49	·56	·6	·70	·32	·61	·25	·85	·45
Difference ...	+·35	+·54	−·33	−·50	−·12	−·21	−·1	−·67	−·05	−·46	−·19	−·82	...
II.—District mortality excluding Towns:—													
Number of districts affected ...	32	22	37	29	5	21	22	3	23	13	11	4	222
Highest district ratio	2·53	4·34	1·15	·72	·84	1·20	2·0	·08	1·02	·61	·07	1·11	4·34
Name of that district	Howrah	Rungpur	Mirzapur.	Mianwali.	Kohat	Bilaspur	Vizagapatam.	Yedenalknad Taluk	East Khandesh	Pegu	Minbu	Dewair	Rungpur.
Lowest district ratio	·04	·01	·001	·01	·04	·01	·04	·03	·003	·002	·003	·08	·001
Name of that district	Sambalpur.	Chittagong.	Bara Banki.	Gujranwala.	Bannu	Betul	Anantapur.	Padinalknad Taluk.	Thazant Parkar.	Henzada	Myingyan	Jassakhera.	Bara Banki.
Number of districts without mortality.	Nil	Nil	11	Nil	Nil	3	Nil	2	2	5	Nil	13	36
District death rate per 1,000 of population.	·66	·80	·13	·17	·31	·35	·5	·04	·20	·12	·03	·05	·43
III.—Town mortality :—													
Number of Towns affected ...	108	37	28	60	6	46	99	...	27	16	10		437
Highest town ratio	8·21	1·93	2·70	4·25	1·82	5·07	6·1	...	5·67	1·63	2·57		8·21
Name of that town	Manikatala.	Nawabganj.	Ahraura	Zira	Kohat	Jalgaon	Cocanada	...	Nasirabad.	Pegu	Magwe		Manikatala.
Lowest town ratio	·03	·05	·004	·02	·21	·01	·01	...	·03	·03	·07	Nil	·004
Name of that town	Cuttack	Jamalpur	Lucknow	Jullundur	Nowshera kalan (notified area).	Jubbulpur	Negapatam.	...	Sholapur	Bassein	Pyinmana		Lucknow.
Number of towns without mortality	21	17	77	74	6	60	133	...	38	23	7		456
Town death rate per 1,000 of population.	2·22	·39	·07	·12	·42	·32	·3	...	·66	·34	·31		·63
IV.—Infantile mortality :—													
Children under one year ...	4,900	3,922	1,251	721	157	1,478	6,362	...	1,828	22	1	5	20,647
Children 1—10 years	11,597	8,128	2,095	1,706	394	1,515	4,244	...	2,399	119	5	10	33,112
Percentage of children in total small-pox mortality.	42·73	51·05	71·88	72·40	90·18	72·03	56·23	...	84·82	26·91	3·39	93·75	53·15

GENERAL POPULATION.

TABLE XXIX.—FEVER MORTALITY.

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	67,932	55,912	168,488	50,863	5,185	12,726	22,738	305	20,826	4,128	1,729	1,460	412,291
February	65,193	48,878	116,335	33,851	3,737	11,819	19,681	281	19,011	3,897	1,572	1,057	325,312
March	93,220	66,561	112,550	31,464	3,529	12,910	20,737	326	20,413	3,437	2,051	1,087	368,285
April	77,551	62,673	120,676	28,367	2,659	12,032	19,063	304	18,834	3,955	1,766	1,115	348,995
May	79,527	64,144	106,638	30,597	2,951	14,930	20,608	340	17,999	3,514	1,823	935	344,906
June	76,423	59,774	93,311	29,499	2,671	12,938	21,236	354	15,720	3,848	1,988	676	318,438
July	73,484	52,639	84,108	22,593	2,700	13,276	21,548	418	17,144	5,038	2,715	705	296,368
August	88,411	55,666	106,073	25,558	2,352	15,831	21,337	421	18,282	5,005	2,601	1,110	342,637
September	92,609	49,633	129,395	30,718	2,338	18,410	22,842	353	17,508	4,542	2,606	1,057	372,512
October	94,863	49,463	146,157	41,845	3,363	19,941	24,820	327	18,323	4,251	2,521	1,988	409,862
November	138,149	82,765	142,919	43,749	3,699	19,174	25,742	363	20,090	5,036	3,249	2,062	486,996
December	108,875	84,380	146,919	41,169	4,519	16,857	28,056	331	19,738	5,862	3,625	1,958	461,789
Total ...	1,056,237	732,488	1,475,570	410,273	39,403	180,544	268,408	4,113	223,888	52,513	28,246	15,869	4,487,492
B.—Annual death ratios:—													
Ratio per 1,000 of population, 1909	20·90	24·56	30·94	20·40	20·65	15·08	7·3	22·77	12·11	9·44	9·47	33·15	19·82
Ratio per 1,000 of population, 1908	23·44	22·37	41·31	34·66	26·62	18·16	8·0	27·84	13·17	9·63	8·23	30·79	23·96
Difference ...	—2·54	+2·19	—10·37	—14·26	—5·97	—3·08	—·7	—5·07	—1·06	—·19	+1·24	+2·36	—4·14
Mean ratio per 1,000 during 1904-1908 ...	22·66	22·50	29·62	22·47	25·24	17·29	7·9	24·46	13·80	9·71	7·39	24·68	20·21
Difference ...	—1·76	+2·06	+1·32	—2·07	—4·59	—2·21	—·6	—1·69	—1·69	—·27	+2·08	+ 8·47	—·40
II.—District mortality excluding towns:—													
Number of districts affected ...	32	22	48	29	5	24	22	5	25	18	14	17	258
Highest district ratio ...	33·92	37·83	44·05	29·00	24·60	24·87	15·8	33·44	24·31	20·38	17·44	62·52	62·52
Name of that district	Darbhanga.	Goalpara.	Bareilly.	Multan.	Dera Ismail Khan.	Damoh.	Vizagapatam.	Nanjarajpatna.	Ahmedabad.	Thayetmyo.	Mandalay.	Ghegal.	Ghegal.
Lowest district ratio	6·94	15·46	16·88	4·20	15·83	6·38	1·0	15·69	4·63	3·09	4·34	20·33	1·0
Name of that district	Puri ...	Sibsagar.	Garhwal.	Simla.	Hazara.	Akola.	Anantapur.	Yedenalknad.	Belgaum.	Maubin.	Meiktila.	Sawar.	Anantapur.
Number of districts without mortality	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.
District death rate per 1,000 of population.	21·64	24·82	31·27	20·55	21·19	15·79	7·6	22·96	12·75	10·10	10·26	33·93	20·47
III.—Town mortality :—													
Number of towns affected ...	129	54	105	134	12	106	229	5	65	39	17	6	901
Highest town ratio	40·75	34·33	58·18	43·59	17·18	22·28	21·3	31·25	26·20	22·56	13·25	63·92	33·92
Name of that town	Sahibganj	Cox's Bazar.	Balrampur.	Kot Mithan.	Dera Ismail Khan	Etawah.	Srungavarapukota.	Fraserpet.	Larkhana.	Pyapon.	Yenangyaung.	Pisangan	Pisangan.
Lowest town ratio	1·67	·66	10·68	1·68	7·12	1·43	·1	16·81	·88	1·44	·56	13·16	·1
Name of that town	Balasore.	North Lakhimpur.	Allahabad	Khangah Dogran	Kulachi.	Deulgaon	Arcot.	Virajendrapet.	Gadag-Bettigeri.	Moulmein.	Myingyan	Nasirabad.	Arcot.
Number of towns without mortality	Nil	Nil.	Nil.	Nil.	Nil.	Nil.	3	Nil.	Nil.	Nil.	Nil.	Nil.	3
Town death rate per 1,000 of population.	10·01	12·79	26·50	19·03	14·21	8·96	5·5	20·72	7·39	4·91	3·13	31·06	18·44

General Population.

Table XXX.—Dysentery and Diarrhœa mortality.

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	2,699	1,461	926	1,108	28	1,943	4,872	16	2,173	487	109	39	15,861
February	2,467	1,177	805	646	17	1,746	4,310	44	1,944	573	82	17	13,828
March	3,364	1,820	819	554	35	1,854	3,876	6	2,057	512	125	32	15,054
April	2,731	2,428	1,105	694	19	1,790	3,281	8	2,800	660	115	56	15,687
May	2,859	2,874	1,403	343	59	2,137	3,575	16	2,554	772	232	53	17,377
June	3,072	2,834	1,428	809	40	2,074	3,589	20	2,826	979	271	22	17,962
July	3,315	2,463	1,423	691	43	3,161	4,309	24	4,251	1,306	664	27	21,677
August	3,714	2,124	1,425	862	35	4,717	4,206	16	4,763	1,193	586	62	23,698
September	2,936	1,937	1,368	1,151	32	4,078	4,171	10	3,858	872	372	90	21,775
October	2,652	2,106	1,191	1,137	39	3,970	4,181	10	3,016	596	265	43	19,156
November	3,064	2,534	1,179	1,033	19	2,795	3,800	9	2,487	673	221	54	17,868
December	3,108	2,413	1,188	888	41	2,278	4,006	8	2,310	539	193	41	17,013
Total ...	35,981	26,171	14,260	10,416	407	33,386	48,176	187	35,039	9,162	3,235	536	216,956
B.—Annual death ratios—													
Ratio per 1,000 of population, 1909	·71	·87	·30	·52	·21	2·79	1·3	1·04	1·90	1·65	1·08	1·13	·96
Ratio per 1,000 of population, 1908	1·28	·83	·41	1·05	·17	3·40	1·7	2·26	2·21	1·77	·68	1·52	1·26
Difference ...	—·57	+ ·04	—·11	—·53	+ ·04	—·61	—·4	—1·22	—·31	—·12	+·40	—·39	—·30
Mean ratio per 1,000 during 1904-1908...	·99	·77	·50	·79	·27	3·22	1·6	12·3	2·96	1·54	·52	1·08	1·21
Difference ...	—·28	+·10	—·20	—·27	—·06	—·43	—·3	—11·26	—1·06	+·21	+·56	+·05	—·25
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	24	22	5	25	18	11	13	259
Highest district ratio ...	4·29	7·31	6·91	2·84	·47	8·80	5·5	1·32	5·43	2·39	1·64	·48	8·80
Name of that district ...	Puri	Lakhimpur.	Garhwal	Simla	Dera Ismail Khan.	Akola	Nilgiris	Kiggatnad	Sholapur	Mergui.	Yamethin.	Dewair	Akola
Lowest district ratio ...	·03	·02	·01	·04	·01	·17	·2	·23	·02	·38	·20	·03	·01
Name of that district ...	Purnea	Malda	Bahraich	Hoshiarpur.	Kohat	Bhandara	Vizagapatam	Mercara Taluk.	Upper Sind Frontier.	Toungoo	Kyaukse	Bhinai	Kohat
Number of districts without mortality.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	5	5
District death rate per 1,000 of population.	·61	·85	·22	·38	·16	2·81	1·1	·70	1·78	1·27	1·02	·08	·84
III.—Town mortality :—													
Number of towns affected ...	135	48	94	129	11	105	213	4	63	37	17	3	849
Highest town ratio ...	7·67	8·43	5·09	4·98	2·04	8·72	11·3	9·80	9·72	14·49	4·93	7·81	14·49
Name of that town	Uttarpara	Mangaldai	Chandausi	Kalabagh	Tank (Notified area.)	Sirasgaon	Palamcottah	Virajendrapet.	Athni	Myanaung.	Pyinmana	Ajmer Suburb.	Myanaung
Lowest town ratio	·08	·04	·05	·19	·18	·23	·3	1·88	·19	·21	·48	2·49	·04
Name of that town	Jagadispur.	Serajganj	Deoband	Khangah Dogran.	Haripur	Ramtek	Tenali	Fraserpet	Kaira	Thaton	Magwe	Nasirabad	Sirajganj
Number of towns without mortality.	4	6	11	5	1	1	19	1	2	2	Nil	3	55
Town death rate per 1,000 of population.	2·07	1·75	1·35	1·76	·77	2·62	3·1	4·66	2·46	4·25	1·65	3·91	2·29

General Population.

Table XXXI.—Plague mortality.

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total, 1909.	Total, 1908.
British Provinces.—														
Bengal	911	1,210	2,343	1,137	954	352	169	212	211	283	926	3,071	11,779	15,948
Eastern Bengal and Assam	...	...	1	...	...	...	...	...	...	...	...	...	1	...
United Provinces of Agra and Oudh.	1,336	2,121	4,384	3,701	2,353	304	634	1,751	1,687	1,792	5,101	14,230	39,394	22,878
Punjab	1,791	2,420	5,839	8,753	7,763	1,027	47	58	322	1,148	1,937	4,550	35,655	30,708
North-West Frontier Province.	...	...	...	...	1	...	...	...	...	...	...	...	1	563
Central Provinces and Berar	379	1,635	1,377	336	97	16	33	526	2,973	5,435	3,072	2,837	19,216	6,236
Madras Presidency ...	185	165	111	80	90	168	410	674	755	506	383	317	3,844	3,358
Coorg	...	...	...	...	...	...	...	...	...	1	1	...	2	26
Bombay Presidency ...	1,793	1,867	3,179	2,772	1,517	354	653	1,674	2,434	3,282	2,696	2,298	24,319	27,345
Burma { Lower ...	316	608	617	292	152	260	405	403	123	62	35	92	3,365	5,169
Burma { Upper ...	1,160	1,238	591	94	13	4	30	73	54	21	50	253	3,681	1,583
Ajmer-Merwara ...	...	53	31	14	13	...	...	29	714	1,779	1,437	1,086	5,176	74
Total { 1909 ...	8,371	11,317	18,473	16,179	12,953	2,485	2,381	5,200	9,273	14,309	15,658	28,734	145,333	...
Total { 1908 ...	9,842	16,840	27,266	22,959	8,627	2,070	1,630	2,777	5,049	6,202	5,132	5,533	...	113,888
Native States, etc.—														
Eastern Bengal and Assam Native States.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh Native States.	...	...	...	...	...	...	...	...	...	...	...	...	...	3*
Punjab Native States ...	701	633	960	1,319	1,680	370	74	39	209	485	1,137	1,802	9,409	9,424
Jammu and Kashmir States	...	...	2	15	12	...	...	...	2	26	39	60	156	61
Baluchistan	...	1	...	...	...	...	...	...	...	...	...	...	1	1
Rajputana	679	623	1,267	971	344	224	1	47	379	639	693	617	6,084	7,862
Central India	75	105	80	8	2	...	16	200	1,013	1,324	463	247	3,533	1,404
Native States in Central Provinces.	...	...	...	...	...	...	...	...	...	4	...	...	4	...
Bombay Presidency Native States.	768	1,014	1,290	537	167	64	83	704	1,018	1,046	790	801	8,282	14,327
Hyderabad State ...	142	101	18	1	...	...	...	...	68	61	42	60	493	1,625
Mysore	276	261	236	28	26	144	274	442	767	745	538	311	4,048	7,133
Bangalore, Civil and Military Station.	38	78	32	28	19	22	30	30	74	94	84	33	562	750
Madras Native States ...	...	...	...	...	...	...	...	1	...	...	2	...	3	2
Total { 1909 ...	2,679	2,816	3,885	2,907	2,750	824	478	1,463	3,530	4,424	3,788	3,931	33,475	...
Total { 1908 ...	4,363	6,126	8,117	5,596	3,232	639	547	1,824	3,396	3,681	2,839	2,232	...	42,592
Grand Total { 1909 ...	11,050	14,133	22,358	19,086	15,703	3,309	2,859	6,663	12,803	18,733	19,446	32,665	178,808	...
Grand Total { 1908 ...	14,205	22,966	35,383	28,555	11,859	2,709	2,177	4,601	8,406	9,883	7,971	7,765	...	156,480
Calcutta City	61	92	345	435	632	273	114	57	31	29	23	25	2,117	...
Bombay City	65	277	1,488	1,785	987	160	112	140	75	47	25	25	5,186	...
Madras City	...	...	1	...	...	...	...	...	2	...	...	...	3	...

* Suspected plague deaths—imported.

General Population.

Table XXXII.—Mortality from Respiratory Diseases.

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	1,279	437	1,395	4,153	149	2,709	2,539	7	4,602	389	187	28	17,874
February	1,339	456	1,409	3,760	133	2,558	2,197	3	4,311	487	140	21	16,814
March	1,547	506	1,467	4,030	121	2,602	2,194	8	4,540	474	147	22	17,657
April	1,239	380	1,450	3,474	135	2,380	1,995	3	4,357	410	149	14	15,986
May	1,195	410	1,398	3,472	161	2,295	2,162	3	4,034	397	156	20	15,703
June	1,029	325	1,045	2,908	156	1,819	2,120	...	3,748	461	150	8	13,749
July	1,055	271	1,126	2,462	168	2,107	2,419	4	4,444	492	210	6	14,764
August	1,146	317	1,217	2,783	131	2,628	2,341	4	5,103	542	218	18	16,448
September	1,052	320	1,323	3,587	135	2,816	3,479	7	4,808	469	182	15	17,193
October	1,221	311	1,331	4,323	106	2,910	2,495	6	4,500	469	192	30	17,894
November	1,469	504	1,426	4,771	114	3,013	2,510	5	4,481	518	199	19	19,039
December	1,506	484	1,799	4,941	142	3,858	2,848	9	4,805	517	224	29	20,258
Total ...	15,071	4,721	16,386	44,664	1,631	31,090	29,299	59	53,433	5,625	2,154	230	203,363
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1909	·29	·15	·34	3·22	·85	2·60	·8	·33	2·89	1·01	·72	·48	·90
Ratio per 1,000 of population, 1908	·30	·13	·43	3·23	·97	2·59	·8	·12	9 6	·94	·81	·61	1·01
Difference ...	—·01	+·02	—·09	—1·00	—·12	+·01	...	+·21	—·07	+·07	—·09	—·13	—·11
Mean ratio per 1,000 during 1904-1908	·24	·08	·44	2·99	·73	1·84	·6	·21	3·11	·72	·66	·75	·16
Difference ...	+·05	+·07	—·10	—·77	+·12	+·26	+·2	+·12	—·22	+·29	+·06	—·27	+·74
II.—District mortality excluding towns :—													
Number of districts affected ...	31	22	48	29	5	24	22	5	24	18	11	6	245
Highest district ratio	1·75	2·29	4·25	8·88	1·23	10·57	1·9	·14	8·61	1·08	·88	1·59	10·57
Name of that district	Puri	Lakhimpur.	Hamirpur.	Gurdaspur.	Hazara	Nimar	Anantapur.	Mercara Taluk.	Kaira	Tavoy	Shwebo	Dewair	Nimar
Lowest district ratio	·002	·005	·01	·10	·17	·16	·1	·03	·02	·09	·04	·06	·002
Name of that district	Shahabad	Noakhali	Bahraich	Multan	Kohat	Bhandara.	Vellore	Kiggatnad.	Larkhana.	Prome	Kyaukse	Pisangan	Shahabad.
Number of districts without mortality	1	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	1	*Nil*	*Nil*	11	13
District death rate per 1,000 of population.	·16	·15	·19	1·94	·55	2·45	·7	·08	2·09	·42	·28	·06	·68
III.—Town mortality :—													
Number of towns affected	104	35	86	134	12	103	183	1	63	34	16	3	774
Highest town ratio	7·37	1·82	13·81	18·56	8·61	19·29	8·5	6·68	16·00	10·88	13·57	3·60	19·29
Name of that town	Maniktala	Dhubri	Benares	Dalhousie	Haripur	Khurai.	Kamudi	Mercara.	Ahmedabad.	Yandoon	Myingyan	Nasirabad.	Khurai
Lowest town ratio	·04	·10	·06	·59	·23	·06	·03	...	·00	·07	·41	1·44	·00
Name of that town	Hajipur	Silchar	Mubarakpur.	Khaagah Dogran.	Tank (Notified area).	Umrer	M. T. C. Nellore.	...	Ahmedabad Cantt.	Thaton	Pakokku	Ajmer	Ahmedabad Cantt.
Number of towns without mortality	25	19	19	*Nil*	*Nil*	8	49	4	2	5	1	3	130
Town death rate per 1,000 of population.	2·26	·45	2·39	4·83	3·78	3·89	1·4	2·95	7·51	5·10	4·27	1·62	3·31

General Population.

Table XXXIII.—*Vaccination.*

A.—Total Primary vaccinations and Revaccinations; successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1909-10.

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases to total operations.*		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of persons vaccinated by each vaccinator of the Special Staff.	Total cost of the Special Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Revaccination.	Primary.	Revaccination.	Under one year.	1 to 6 years.		Rs.	Rs. A. P.
Bengal	1,868,585	185,188	98·97	63·26	934,181	810,879	1,083	2,13,696	0 1 9
Eastern Bengal and Assam ...	1,301,574	163,027	96·21	75·61	358,126	703,038	1,234	1,13,999	0 1 4
United Provinces of Agra and Oudh	1,279,472	111,489	97·56	82·54	776,878	400,039	1,505	1,71,345	0 2 1
Punjab	528,347	142,189	97·58	74·32	402,566	88,706	2,504	1,20,509	0 3 3
North-West Frontier Province ...	94,701	7,866	98·67	82·76	57,106	20,370	2,831†	14,744	0 2 5
Central Provinces and Berar ...	535,697	73,909	99·15	77·67	416,269	99,231	1,789	67,819	0 1 11
Madras	1,447,328	204,700	92·08	77·58	609,178	526,243	1,977‡	3,27,774	0 3 8
Coorg	9,121	2,850	92·67	74·93	706	4,131	1,308	2,813	0 4 5
Bombay	665,917	48,961	98·96	70·86	489,008	111,397	1,630	347,974	0 8 10
Burma	353,616	54,089	95·26	62·81	86,639	168,258	1,475	1,80,784	0 8 5
Ajmer-Merwara	11,875	85	97·12	87·06	9,111	2,297	797	3,033	0 4 2
Total ...	8,096,233	994,353	94·62	66·58	4,139,768	2,934,589	1,427	15,64,490	0 3 0

* Excluding those the results of which were not known.
† Including vaccinations performed in cantonments and Political Agencies.
‡ Excludes ayerage of work done by medical subordinates.

B.—Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1909-10.

Province.	Population.	Number of operations performed (primary and revaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small-pox.*	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Bengal	48,492,815	1,923,802	129,971	2,053,773	40·30	48·16	38,609	·76
Eastern Bengal and Assam ...	30,961,459	1,461,288	3,313	1,464,601	43·86	28·92	23,604	·79
United Provinces of Agra and Oudh ...	47,960,667	1,390,708	253	1,390,961	27·45	40·50	5,907	·12
Punjab	20,296,870	669,610	926	670,536	29·00	49·58	3,352	·17
North-West Frontier Province ...	2,030,620	101,901	666	102,567	47·36	70·31	611	·32
Central Provinces and Berar	13,601,341	603,008	6,598	609,606	42·27	76·51	4,155	·35
Madras	38,227,818†	1,652,007	21	1,652,028	37·42	39·84	18,862	·5
Coorg	180,607	11,772	199	11,971	56·77	9·77	6	·03
Bombay	21,438,769	712,608	2,270	714,878	29·42	57·02	5,019	·27
Burma	10,477,508	395,444	12,261	407,705	33·50	20·68	1,011	·12
Ajmer-Merwara	476,912	11,960	...	11,960	24·34	47·76	16	·03
Total ...	234,145,386	8,934,108	156,478	9,090,586	35·55	44·20	101,152	·45

* For the Calendar year.
† Excludes the population of the cantonments of Bangalore and Secunderabad.

PRESENTED
BY

EAST INDIA (SANITARY MEASURES).

REPORT

ON

SANITARY MEASURES IN INDIA

IN

1910-1911.

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TABLE OF CONTENTS.

SECTION I.

EUROPEAN ARMY OF INDIA.

PARA.		PAGE.
1.	India	1
2.	Northern and Southern Armies. Division. Stations. ...	1
3.	Geographical groups	1
4.	Cholera	2
5.	Small-pox	2
6.	Malaria	2
7.	Pyrexia of uncertain origin	5
8.	Sandfly fever	5
	Symptomatology	5
	Etiology	6
	The insect carrier	7
	Prevention	8
9.	Mediterranean fever, Kala Azar	9
10.	Enteric fever in 1910	9
11.	Reports by Medical Officers and references to the literature for the year	9
	The bacilli	10
	Bacteriological methods of diagnosis	11
	Epidemiology, Bacillus carriers	13
	Modes and vehicles of spread	13
	Preventive inoculation	15
12.	Plague and some other diseases	16
13.	Tubercle of the lungs	16
14.	Pneumonia	16
15.	Respiratory diseases	16
16.	Dysentery and Diarrhœa	16
17.	Hepatic abscess	16
18.	Venereal diseases	17
19.	Heat Stroke	17
20.	Suicide	17
21.	Invaliding	17
22.	Officers	18
23.	Women	18
24.	Children	19

SECTION II.

INDIAN ARMY.

25.	India	23
26.	Northern and Southern Armies Divisions	23
27.	Geographical groups	24
28.	Stations	24
29.	Cholera	24
30.	Small-pox	24
31.	Malaria	24

SECTION II—*contd.*

INDIAN ARMY—*contd.*

PARA.		PAGE.
32.	Pyrexia of uncertain origin	25
33.	Sandfly-fever	25
34.	Kala Azar, Relapsing fever, Typhus fever	25
35.	Enteric fever	26
36.	Mediterranean fever	26
37.	Plague	26
38.	Scurvy	26
39.	Tubercle of the lungs	27
40.	Pneumonia	27
41.	Dysentery and Diarrhœa	27
42.	Venereal diseases	28
43.	Beri-beri	28
44.	Suicide	28

SECTION III.

GENERAL POPULATION.

45.	Meteorology, crops and general conditions	29
46.	Births and deaths	29
47.	Chief diseases	30
48.	Bengal	31
49.	City and Port of Calcutta	31
50.	Eastern Bengal and Assam	32
51.	United Provinces	32
52.	Punjab	33
53.	North-West Frontier Province	33
54.	Central Provinces	34
55.	Madras	34
56.	City of Madras	34
57.	Bombay	35
58.	City and Port of Bombay	35
59.	Burma	35
60.	Coorg and Ajmer-Merwara	36
61.	Red Sea Pilgrim Traffic	36

SECTION IV.

JAILS OF INDIA.

62.	India	37
63.	The prison population in 1910. Total sickness and mortality rates	37
64.	Causes of sickness and mortality	37
65.	Malaria	37
66.	Dysentery	38
67.	Tubercle of the lungs	39
68.	Pneumonia	39
69.	Cholera, small-pox, plague, enteric fever, Kala Azar ...	39
70.	Bengal	39
71.	Eastern Bengal and Assam	40
72.	United Provinces	41

SECTION IV—*contd.*

JAILS OF INDIA—*contd.*

PARA.		PAGE.
73.	Punjab	41
74.	North-West Frontier Province	42
75.	Central Provinces	42
76.	Madras	43
77.	Bombay	43
78.	Burma	43
79.	Andamans	44

SECTION V.

VACCINATION.

80.	Vaccination in India	45
81.	Supply of vaccine	45
82.	Bengal	45
83.	Eastern Bengal and Assam	46
84.	United Provinces	47
85.	Punjab	47
86.	North-West Frontier Province	48
87.	Central Provinces and Berar	48
88.	Madras	49
89.	Coorg	49
90.	Bombay	50
91.	Burma	50
92.	Ajmer-Merwara	51
93.	Vaccination among troops...	51

SECTION VI.

MEDICAL INSTITUTIONS.

A.—Civil Hospitals and Dispensaries (State General, Local Fund, and Private-aided).

94.	India	53
95.	Bengal (excluding Calcutta)	54
96.	Calcutta	54
97.	Central Provinces	54
98.	Eastern Bengal and Assam	54
99.	United Provinces	54
100.	Punjab	55
101.	Bombay	55
102.	Madras	55
103.	Burma	55
104.	North-West Frontier Province	55
105.	Baluchistan	56
106.	B. Civil Hospitals and Dispensaries (State Special, Railway and private non-aided)	56
107.	C. Lunatic Asylums	56
108.	Bengal	57
109.	Eastern Bengal and Assam	57
110.	United Provinces	57
111.	Punjab	57
112.	Burma	57
113.	Central Provinces	57

SECTION VI—*contd.*

MEDICAL INSTITUTIONS—*contd.*

PARA.		PAGE.
114.	Bombay	57
115.	Madras	57
	D. Medical Colleges and Schools.	
116.	Bengal	57
117.	Eastern Bengal and Assam	58
118.	United Provinces	58
119.	Punjab	58
120.	Burma	58
121.	Madras	58
122.	Bombay	59
123.	The X-Ray Institute of India	59

SECTION VII.

SANITARY WORKS.

124.	Bengal	61
125.	Sanitary Board	61
126.	Eastern Bengal and Assam	62
127.	Sanitary Board	62
128.	United Provinces	62
129.	Sanitary Board	62
130.	Punjab	63
131.	Sanitary Board	64
132.	North-West Frontier Province	64
133.	Central Provinces and Berar	64
134.	Madras	65
135.	Sanitary Board	65
136.	Bombay	65
137.	Sanitary Board	66
138.	Burma	66
139.	Sanitary Board	66
140.	Military Works	66

SECTION VIII.

GENERAL REMARKS.

141.	Laboratories.	
	Central Research Institute	67
	Bombay Bacteriological Laboratory	67
	King Institute of Preventive Medicine	68
	Pasteur Institute, Kasauli	68
	Pasteur Institute of Southern India, Conoor	69
142.	Special Enquiries.	
	Plague	69
	Leprosy	69
	Malaria	70
	I. Work of the Central Committee	70
	II. Measures undertaken in the several provinces ...	70
	III. Special Malaria investigations	71
143.	Scientific publications	74

EUROPEAN ARMY OF INDIA.

SECTION I.

India.

1. The year 1910 was one in which no adverse climatic or other conditions tended to check the remarkable decline of sickness and mortality which, during recent years, has occurred among the European troops in India. The daily average strength upon which the ratios for 1910 are based was 72,491. All the chief rates were the lowest on record and the degree to which they were lower than those for 1909 and for the preceding quinquennium will be seen from the statement in the margin. The decrease of sickness as compared with 1909 was shared by every principal disease except tubercle of the lungs and diseases of the respiratory system. The chief cause of mortality was, as usual, enteric fever, but only 46 deaths resulted from it as compared with 113 in the previous year; and to this diminished mortality more than 59 per cent of the decrease in the total death rate was due. From all causes only 563 men were invalided to England as compared with 649 in the previous year and 1,078 in 1908. Tubercle of the lungs was the chief cause of this source of loss during 1910, the number invalided on account of it being 71. Nervous diseases caused 54 invalidings, mental diseases 37 and ear diseases 47.

India.	All causes. Ratios per 1,000.		
	1904-08	1909.	1910.
Admissions ...	840·6	716·9	576·5
Constantly sick ...	50·6	40·3	31·9
Deaths ...	9·86	6·25	4·66
Invalids ...	25·23	9·07	7·77

One of the results of the present very low rates of sickness, death and invaliding in the European Army of India has been to reduce considerably the annual number of men drafted to this country (see Table XV),* and as the new arrivals are young soldiers very susceptible to disease this reduction of their number tends in its turn to react favourably upon the rates of sickness, mortality and invaliding.

Northern and Southern Armies.

2. The relative sickness and mortality among the troops of the Northern and Southern Armies can be ascertained from Table ii to this section. The rates of sickness and death were, as usual, higher in the Northern Army than in the Southern, and from the statistics in Table II it will be seen that during the year under report this was due to the greater prevalence of nearly all the chief diseases. Venereal disease, however, was, as usual, more prevalent in the Southern Army than in the Northern. The statistics relating to Divisions (Table I-A*) show that all of them shared in the decrease of sickness which was so marked a feature of the year and that except the 5th (Mhow) Division they all shared in the decreased mortality. In the Mhow Division the death rate from enteric fever was only very slightly lower than in 1909 and the mortality from abscess of the liver and tubercle of the lungs increased. The statistics of troops in the Quetta, Secunderabad and Rawalpindi Divisions were more favourable than in the other Divisions during 1910 and the health of the troops in the Aden Brigade was unusually good.

Only nine stations as compared with twelve last year come in the list of those that, according to the statistical method adopted in this report, are to be regarded as having been especially unhealthy during the year. Full abstracts of the sanitary reports on these stations will be found in Table V,* so it is unnecessary to do more than draw attention to them here. As regards the prevalence of important diseases in plains stations where the average annual strength was 500 or more, the incidence of enteric fever was greatest at Sialkot, Kamptee, Fyzabad, Jhansi and Kirkee; of malaria at Peshawar, Agra, Mhow, Ferozepore and Hyderabad; of dysentery at Jubbulpore, Poona, Kamptee, Lahore and Colaba; and of venereal diseases at Colaba, Fyzabad, Bangalore, Cawnpore and Allahabad.

Geographical groups.

3. In the tables appended to this report will be found the statistics of European troops compiled according to the areas into which India has been divided from the meteorological and physiographical points of view. It will be seen that in all the

*When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

groups the admission and death rates were lower than in 1909. Sickness was greatest in the North-West Frontier group where fevers, influenza, respiratory diseases and pneumonia were prevalent. In the plains of India the incidence of enteric fever was highest in the Deccan, the Gangetic plain and the Central India groups, of malaria in the North-West Frontier group and of dysentery in the Deccan and the Western Coast groups. The highest death rate in any group during the year was 6·86 per thousand in the Bengal and Orissa group which includes the stations of Fort William, Dum Dum and Barrackpore.

Cholera.

4. Cholera caused nine admissions to hospital and seven deaths as compared with twelve admissions and seven deaths in 1909. The stations at which the cases occurred were Dinapore, Landour, Benares and Fyzabad. All the cases occurred during the monsoon period of the year. The sanitary officer of the Lucknow Division investigated the outbreak at Dinapore. His report states that there were five cases with three deaths between the 7th and 18th of June. He isolated the cholera vibrio from the evacuations of two patients, but failed to do so from samples of water obtained from various suspected sources. In his opinion the first three patients had become infected either through the agency of native cooks or from some article of food brought into barracks, and that the last two had become infected in the village of Sharpur where a number of cases of cholera had occurred. From the report of the medical officer in charge of the station hospital it appears that these two men had drunk water obtained by a native from the village well and that they became ill a few hours afterwards. Two other men who accompanied them, but did not drink the water, remained well. The three cases at Landour occurred between the 6th and 9th of July. It is said that the first patient contracted the disease from eating raw fruit bought in the bazaar and that it was probable the other two patients became infected indirectly or directly from the first case. The source of infection in the cases at Benares and Fyzabad was not discovered.

Small-pox.

5. Only three cases of small-pox occurred during the year as compared with nineteen in 1909. The stations at which the cases occurred were Rangoon, Bangalore and Quetta. The patients at Quetta and Bangalore had been successfully revaccinated in 1908 and 1909, respectively, but the patient at Rangoon—a bandsman—had not been successfully vaccinated since infancy. All the cases were of a modified type and ended in recovery.

Malaria

6. The autumn of 1909 was much less malarious than usual and the following year was very healthy almost throughout the country. The sanitary circumstances of the European troops were such as to enable them to obtain full benefit from these favourable conditions and especially as regards malaria a great decline of prevalence was the result. The admissions to hospital numbered only 9,572 (132 per thousand) as compared with 14,511 (203 per thousand) in 1909 and the number of cases treated "in barracks" was only 3,316 as compared with 6,909. The deaths were only seven against 26 and the invalidings to England only five against 76. From Appendix B* and Table X* it will be seen that the decreased prevalence was common to nearly all the principal geographical areas of the country, but it was somewhat greater in the Northern Army than in the Southern. Omitting stations with an annual average strength below 500, the highest admission rates for the year were recorded in Peshawar (652 per thousand), Agra (535), Mhow (363), Ferozepore (341) and Hyderabad (315) all situated in one or other of the three geographical areas, Indus Valley, Central India and Upper Sub-Himalaya, which are usually the most malarious; but in all these stations except Peshawar the admission rates were considerably lower than in 1909. In Peshawar the rainfall of the year was more than 8½ inches in excess of the normal, in Agra it was more than 3½ inches in excess and in Mhow more than two inches.

It appears from the reports of medical officers that the microscope was used in every case of fever as an aid to diagnosis and to the differentiation of the type of malaria, but that in a few stations where the examination of the blood films was not made locally, but in the Divisional laboratories, there was considerable delay in obtaining the results. By far the majority of the cases of malaria which occurred during the year were examples of infection with the benign tertian parasite and next came

*When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

infections with the malignant tertian parasite. Quartan infections were so rare that in only five cases—four at Ahmednagar and one at Poona—was this parasite found. The cases were as a rule mild in character and yielded readily to treatment, but in a few stations, notably Kuldana, Barian, and Rurki, the medical officers resorted to intramuscular injections for the cure and prevention of repeated relapses, and in some other stations this mode of administering quinine was successfully adopted for the treatment of severe primary infections. It has already been mentioned that only seven deaths were recorded as being due to malaria during the year and an examination of the clinical accounts of these fatal cases shows that in two of them the diagnosis of malaria, which was made for statistical purposes on the admission of the patients to hospital, should have been subsequently changed. In one of these cases death was apparently due to valvular disease of the heart and acute pericarditis and in the other to double pneumonia. All the remaining fatal cases were due to infections with the malignant tertian parasite and as regards four of them the outstanding symptoms were respectively, choleraic stools, great dyspnœa and heart failure; epileptiform convulsions and coma; high temperature, delirium and coma; severe anæmia, epistaxis, hæmatemesis and melæna. The fifth case was interesting as being an example in which, apparently in the absence of quinine treatment, repeated examinations of the blood failed to assist the diagnosis until the morning of death when a few crescents were found. Professor Thayer[1] has recently added to the literature in connexion with this important point by publishing clinical accounts of two cases (one of them with symptoms of a grave nature) in which there were so few parasites in the peripheral circulation that in the less severe case the results of blood examinations made daily with great care were negative throughout the course of the disease, and in the grave case were negative during the first eight days of severe malignant tertian remittent fever. Professor Thayer notes that one of these cases was the first in the history of the Johns Hopkins hospital in which it was necessary to resort to the therapeutic test for the proof of the existence of a malarial infection, but he emphasises the lesson illustrated by the two cases reported, namely "that while careful and repeated examinations of blood in a vast majority of cases answer the question as to the presence or absence of malarial infection, really grave malaria may exist for considerable periods of time without demonstrable parasites or pigment in the peripheral circulation. In case of doubt, do not delay too long before applying the therapeutic test."

Measures for the prevention of the disease were carried out in all stations with much energy and, while efforts directed against the parasite in the human host occupied, as usual, the first place in the campaign, attempts were made in a number of stations to extend the use of mosquito curtains and in nearly all stations operations against the breeding places of mosquitoes were by no means neglected. The measures directed against the parasite in the human host included the discovery of all soldiers, whether well or ill, who had parasites in their blood,[2] their segregation under mosquito curtains in separate wards or tents, their treatment until repeated examinations of the blood had proved their freedom from parasites, and finally the administration of prophylactic doses of quinine to all soldiers, followers and children in the garrison and its immediate neighbourhood. It appears that in addition the danger of "malaria carriers" was lessened as far as possible by the transfer of convalescent malaria patients to the hills. These measures were, of course, carried out much more systematically and thoroughly in some stations than in others, but it appears that the practices of subjecting every malarial patient to a course of "after-treatment" lasting as a rule from six weeks to four months and of administering prophylactic doses of quinine as a rule bi-weekly to all soldiers in the garrison were common to all except one or two stations. In some stations the carrying-out of the system of after-treatment was facilitated by keeping up case sheets and nominal rolls of all men who had suffered from malaria during the year; no man's name being struck off the roll until four months had elapsed since the last manifestation of the disease. For prophylactic purposes 10 grains of quinine sulphate made into solution along with a small dose of magnesium sulphate and given twice weekly from June or July to the end of November was the practice most favoured by medical officers during the year, but that there were a number of variations from this practice the following examples show. In Peshawar the dose was 10 grains twice weekly from the 19th July to the 4th August, then the same dose thrice weekly until the 10th October, then 15 grains thrice weekly until the 24th December. In Lahore Cantonment the dose was 10 grains twice weekly until September when 5 grains were given daily, apparently with better

results. In Ambala, Multan and Mount Abu the dose was 15 grains twice weekly, in Jullundur 12 grains and in Campbellpore 15 grains on Thursdays and 10 grains on Sundays. In Delhi 10 grains were given on two consecutive days of the week from the 1st May until the 18th September, then an additional dose of 5 grains daily until the 23rd November, then 10 grains twice weekly until the 16th December. In Lucknow the dose was 5 grains every other day from June 15th until the end of October, but in order that there might be a control to the experiment the men of two companies were not given the prophylactic doses. The statistics supplied with the annual report on this station do not enable any conclusion to be drawn from the experiment.

The use of mosquito curtains by a considerable proportion of soldiers is mentioned in the annual reports of fifteen stations and in a number of them the curtains were bought either by the men themselves or with the aid of regimental funds. Several medical officers draw attention to the fact that many men use the nets very carelessly and without obtaining adequate protection from them, and note that further education on this point is necessary.

Antilarval operations, supplemented in a few stations by fumigation of barracks, were reported to have been carried out in nearly every cantonment in the plains, and the work was done as a rule in a systematic manner by dividing the cantonment into small sections in each of which a "mosquito brigade" supervised by a medical officer, dealt every day with actual and suspected breeding places. These antimosquito organisations have now been in existence for a number of years and they are in a position to carry out, in addition to their important sanitary duties, many useful investigations especially with a view to ascertain the species of anopheles which occur in the different cantonments, their seasonal prevalence, habits, and relation to malaria. The annual reports for 1910 on 77 stations have been examined for information regarding the geographical distribution of the Indian anopheles, but with little success for it was found that the names of the species present in the different cantonments were mentioned in the reports on only 19 stations and that except as regards Delhi four was the largest number of species recorded as occurring in any station. In sixteen stations—in some of which it is known that many anopheles occur—it was recorded that no anopheles were found. Nearly all the thirty or more distinct species of anopheles which occur in India can be collected from the various cantonments scattered throughout the country and it is therefore surprising that the list of anopheles prepared from the information supplied in the annual reports for 1910 includes only seven species. In marked contrast to this record is that of the work carried out by Major F. Smith, R.A.M.C., the Sanitary Officer of the Rawalpindi Division. He was responsible for the collection during the year of two mosquitoes new to entomological science and the list of mosquitoes found by him in the Division includes the names of twelve anophelines and four culicines. The following are some of his conclusions regarding the present state of knowledge about malaria in the Rawalpindi Division: (1) Antilarval operations have so far failed to reduce the incidence of malaria. (2) Rawalpindi cantonment is surrounded by three permanent streams which contain the larvæ of malaria-carrying anopheles all the year round; there are also in the Fort some 30 large tanks which contain water and larvæ throughout the year. The question of success in antilarval operations in the cantonment is bound up with that of the influence of these permanent waters. The kinds of anopheles which occur in adventitious waters in Rawalpindi are not yet completely known; if they are all *rossi* it would explain why antilarval operations have not yet been eminently successful. (3) The conditions at other stations in the Division are similar to those at Rawalpindi, but less is known about them; a great deal of investigation is required and any sudden and complete prevention of malaria is not likely to take place.

Another of the Divisional Sanitary Officers, Captain Smallman, R.A.M.C.,[3] in addition to making valuable observations on the efficacy of the system of "after-treatment" adopted in the Quetta Division, directed his attention to an endeavour to ascertain in regard to crescents their quantity in the peripheral blood, the period of their persistence, the possibility of intermittency either diurnal or corresponding to the tertian character of the fever, and other points. His research was especially interesting as being an example of a study of malarial parasites by an enumerative method. In 1901-02, Lieutenant-Colonel A. Buchanan, I. M. S.,[4] made a somewhat

similar study at Nagpur and quite recently Sir Ronald Ross and Dr. Thomson[5] in England have improved the technique of enumerative methods and have greatly advanced our knowledge of the production and fate of crescents.

Several officers of the Royal Army Medical Corps have attended the classes of instruction in malaria research which are held periodically at Amritsar under the auspices of the central committee for the study of malaria in India.

Pyrexia of uncertain origin.

7. There were only 2,733 admissions to hospital and there was no death recorded under the heading pyrexia of uncertain origin during 1910 as compared with 4,386 admissions and one death in 1909, and only 1,878 cases were treated "in barracks" as compared with 2,165. The annual admission rate is usually high or low according as malaria is more or is less prevalent than usual, and doubtless mild cases of that disease cause a great number of the admissions returned under the heading. Several other diseases, however, are commonly included under it and further efforts to diagnose them definitely are desirable. In Thayetmyo the medical officer reported the occurrence in July and August of an epidemic of "seven-day fever" the chief symptoms being sudden rise of temperature, headache, pains in the back and limbs, a gradual decline of the fever followed by a second rise on the fifth or sixth day, and subsidence of the fever on the seventh day. In Fort William a disease was reported which clinically resembled dengue and was frequently accompanied by a rash, but it was returned under the heading pyrexia of uncertain origin. In Madras 25 cases with similar symptoms were returned as dengue. In a number of the cases returned as pyrexia of uncertain origin the fever lasted only three days or less, and some of these were probably cases of pappataci fever for which a heading is now provided in the statistical forms. Most important of all, however, is the possibility that some of the cases now diagnosed as pyrexia of uncertain origin may be paratyphoid fever. According to the report of the sanitary officer of the 8th (Lucknow) Division this was true of some cases which occurred at Benares; they will be referred to again in the paragraphs on enteric fever.

Sandfly fever.

8. The endemic three-day non-fatal fever now correctly named pappataci fever (Doerr) was given a separate heading for the first time in the statistics for 1910. The heading was used by the medical officers of European troops in only ten stations, the total number of cases recorded under it being 512, of which 298 were in Peshawar, 103 in Nowshera, 36 in Attock, 34 in Lucknow and 20 in Hyderabad, the remaining 21 cases being distributed among Dinapore, Neemuch, Gharial, Dalhousie and Mount Abu. Medical officers say very little about the disease in their annual reports and although very valuable observations upon its etiology and prevalence among European troops in Malta and Crete were published during the year, it appears doubtful if its great importance as a cause of sickness among European troops in India has yet been widely realised. For this reason it will not be out of place to give here a brief summary of the more important facts contained in the recent literature about the disease.

Symptomatology.

The disease is undoubtedly the same as that of which the temperature charts of ten cases occurring among European soldiers in Mian Mir were published in the first report of the antimalarial operations at that cantonment from 1901 to 1903, and is the same, also, as "the three-day fever of Chitral" which was so accurately and completely described by Captain McCarrison, I.M.S., in 1906. According to Franz, one of the members of the Austrian Commission for the investigation of the disease in Herzegovina and Dalmatia, a typical case begins suddenly with a rise of temperature accompanied by headache, great lassitude, and severe pains in the course of certain nerves and groups of muscles. The conjunctivæ and mucous membrane of the throat are deeply reddened and the digestion is disturbed. The temperature remains high for several hours, then sinks slowly so that as a rule it has reached normal by the third day. The stage of convalescence is often accompanied by considerable weakness and by disturbances of the nervous, circulatory, and digestive systems, and may be protracted. The intensity and course of the disease vary greatly, but in the majority of cases the symptoms pointing to affection of the nervous system and the appearance of the conjunctivæ, throat and soft palate are the important diagnostic guides. In more detail the following are some of the outstanding signs relating to different systems. Fever is the first and most frequent symptom. It rises so rapidly that it is often at its highest point (102°—104°) before the patient reaches

hospital and is nearly always at its highest point during the first 24 hours. It remains high for from 12 to 24 hours; the falling part of the curve shows one or more morning remissions. During convalescence the temperature is often subnormal. The duration of fever is usually 2½ to 3 days, but is often only 48 or even 24 hours, and cases without fever have been recorded. On the other hand Pick and Karlinski have recorded cases in which the fever lasted a week or more, but the longest duration observed by Franz in an uncomplicated case was 4½ days. The chief symptoms referable to the nervous system are in mild cases heaviness of the head, lassitude and loss of strength, and in more severe cases intense headache, apathy, depression and rarely delirium or unconsciousness. The affection of the peripheral nerves leads to severe pains chiefly in the back, the lumbar region, between the shoulders and in the calves of the legs. Pain in the eyeballs is usually severe and is made worse by pressure, by movement of the eyes, or by closing the lids. The eyes are usually dry and glazed and the conjunctivæ much injected. The reddening may be diffuse or may occur as a wedge-shaped triangular patch in the neighbourhood of the outer canthus or as a streak on each side of the cornea (Pick's sign). The most important sign relating to the appearance of the mucous membranes is a reddening and swelling of the soft palate, the uvula, the palatal arch and the throat. Sometimes the soft palate is thickly set with small red follicular spots. Taussig observed bleeding from the nose 50 times in 240 cases. There is usually no catarrh of the nasal passages and no symptom of bronchitis. The digestive apparatus is much disturbed and sometimes gastro-intestinal symptoms entirely predominate. There is a characteristic *fœtor ex ore* and the tongue is covered with white fur except for a triangular space at the tip or red stripes on its edges. Vomiting at the onset of the disease is a frequent symptom, but usually occurs only once. Constipation is the rule, but some epidemics have been characterised by the frequency with which diarrhœa has been present. As regards the circulatory system slowing of the pulse and leucopenia are very characteristic signs of the disease. The spleen is not enlarged. The urinary system presents no noteworthy symptom and as regards the muscular system pain, especially on movement or on pressure, is the cardinal sign. There is as a rule no rash on the skin but evidence that the patient has been bitten by "sandflies" is often apparent and is a valuable aid to diagnosis. Before the onset of the disease dullness and slight headache and gastric disturbance may be present for two or three days, but such prodromal symptoms are not the rule. The chief diseases which have to be considered in making the diagnosis are gastro-intestinal catarrh, insolation, enteric fever, relapsing fever, malaria, influenza and dengue.

The incubation period of the disease is usually from five to seven days. One attack protects in considerable degree against a second attack, but the immunity thus acquired is not complete and second or even third attacks sometimes occur. A relapse may occur during convalescence and sometimes a mild abortive attack is followed after a short interval by a more severe relapse.

Etiology.

The invariably negative results which followed the numerous attempts made by Dœrr to detect by microscopic and cultural methods a causal agent in the blood of patients led him to the view that on the analogy with yellow fever the disease must be due to an "invisible virus." He therefore planned his further experiments into the etiology of pappataci fever on the lines of those which had proved so successful in the enquiries concerning the etiology and mode of spread of yellow fever. Lack of space prevents the details of the experiments being given here and it must suffice to enumerate their results together with those of the subsequent experiments made by Dœrr and Russ. They may be stated thus: (1) Pappataci fever is an acute infectious disease entirely distinct from every other disease; (2) the infectious agent is an "invisible virus" which circulates in the blood during the first day of the disease, but has quite disappeared from it by the end of 48 hours; (3) the virus will pass through many close-grained filtering candles but is held back by a Pukall filter; (4) the disease cannot be spread by direct or indirect contact; (5) it is carried by the females of a species of *Phlebotomus* (*P. papatasi*) and is contracted by the bites of insects of this species which some days previously have sucked the blood of a patient during the first day of his illness; (6) an insect which has bitten an infected patient does not become infective until about eight days have elapsed; (7) there is a great similarity between pappataci fever and yellow fever; (8) it is possible that the virus is transmitted through the eggs to the new brood of *Phlebotomi*.

Nearly all the results obtained by Dœrr have been fully confirmed by Lieutenant-Colonel Birt, R.A.M.C., working in Malta and Crete. This observer states his results thus: "By these means it has been proved (1) that the blood of a person suffering from phlebotomus fever is virulent during the first day; (2) that the virus can pass through a Pasteur Chamberland candle "F"; (3) that the *P. papatasi* can convey the infection; (4) that the incubation period has varied from three days sixteen hours to seven days; (5) that *P. papatasi* are infective seven to ten days after sucking infective blood and that negative results were obtained with flies which had been infected under a week; (6) that the virus retains its activity *in vitro* for a week." Colonel Birt remarks that the phlebotomus fever of Malta and Crete is a milder ailment than that of Herzegovina described by Dœrr. It will not be possible to say whether this is true for India until the disease has been more thoroughly studied in this country.

The insect carrier.

According to Howlett three distinct kinds of flies are in India popularly called "sandflies", namely (1) those members of the *Chironomidæ* or "midges" which are grouped under the old generic name *Ceratopogon*, (2) flies belonging to the family *Simuliidæ*, (3) the true sandflies, belonging to the genus *Phlebotomus* of the family *Psychodidæ*. The last of these groups contains the species *Phlebotomus papatasi* which has been proved to carry the virus of the disease now officially known in India as "sandfly fever". This fly is a small yellowish-brown inconspicuous insect with the body and the edges and veins of the wings densely clothed with long hairs. When at rest on a wall its appearance is very characteristic; it has its body well raised on the long legs, its head bent down, the end of the abdomen slightly depressed, and the wings not lying flat and close together over the abdomen, but well separated and raised from the body, the tips pointing outwards and upwards. During the daytime the insects are seldom seen for they remain hidden away behind boxes, cupboards pictures and hanging clothes, but they may sometimes be found in cool bathrooms or latrines. At night they are attracted by light, and Dœrr has stated that in the barracks at Herzegovina he has sometimes seen the petroleum lamps almost covered with dead specimens of *P. papatasi*, adhering to the greasy surface. They bite almost always at dusk, during the night, or in the early morning, and only the females suck blood. Their flight is silent. In addition to *P. papatasi*, which has been found at Rawalpindi and other stations in the north of India, Annandale has described six species of phlebotomus as occurring in this country, namely, *P. argentipes*, which probably occurs throughout the plains, *P. major*, a Himalayan species, *P. perturbans*, which has been found along the base of the eastern Himalayas and in Java, *P. malabaricus*, a southern India species, *P. minutus*, a widely distributed species, and *P. himalayensis*, which occurs on the Himalayas between 4,000 and 7,000 feet. His paper must be consulted for methods of mounting, examining and identifying the different species. Most of the knowledge at present available regarding the life history and habits of the insects is due to Grassi in Italy, Howlett in India and Marett and Newstead in Malta. In 1907 Grassi published a monograph describing the morphology and life history of *P. papatasi*. He reported great difficulty in discovering the larvæ and stated that all the larvæ found by him were obtained from dirty cellars and dark, damp places containing building materials and rubbish of various kinds. He thought that the parts of drains which could not be reached by anything more than splashes of dirty water might be the most favourable breeding places. Howlett says that all attempts to discover the larvæ in their natural habitat in India were negative for many months, but that in August 1908 his assistant, Mr. P. G. Patel, succeeded in obtaining two larvæ, one from a small open drain channel, the other from partially dried mud in a channel leading from a well-reservoir. He stated that the larvæ live in damp, but not very wet, earth and that their food consists of green algal growths. He said that to rear them successfully it was necessary to supply them with this food, to guard against the earth being too dry or too moist, to prevent any trace of mould, to supply fresh air at intervals, and to keep them shaded from the sun. In Malta Captain Marett, R.A.M.C., by enclosing likely breeding places with book-muslin, has succeeded in obtaining adult phlebotomi from the following situations: a hole in a damp stone wall of a garden, a portion of an embankment constructed of loose stones and earth and a natural cleft in the rock of an underground cave. Two larvæ and three pupæ were found on damp stones in the wall and four larvæ on stones in the embankment. In June 1910 Mr. R. Newstead, Lecturer on Economic Ento-

mology at the Liverpool School of Tropical Medicine, visited Malta with the chief object of discovering the principal breeding places of the insects and reported the following results: (1) Larvæ were found between the crevices of rock in a small cave. They were feeding upon the excreta of wood lice and of the larvæ of various insects. The three conditions essential for development would appear to be the presence of organic matter, moisture (but not in excess) and the absence of light. (2) A careful search for the larvæ was made in latrines, drains, main sewers, cesspools, refuse of various kinds, fruit, dead stems of the cactus common to the country and various other substances, the result being in all these cases negative. (3) It was found that three distinct species of *Phlebotomus* occur on the island. (4) A study of the external and internal anatomy of the adult insect was made. In a paper published in July 1911 Captain Marett supplemented his previous observations and stated that the excreta of wood lice and lizards are to a great extent the detritus upon which the larvæ live. He described a successful method of breeding out the eggs, larvæ and pupæ in test tubes.

The eggs, larvæ and pupæ have been described by Grassi, Howlett, Newstead and Marett. The larva is a tiny cylindrical caterpillar-like animal with whitish body and black head. Its most characteristic feature is the presence of long bristles or spines situated on raised tubercles at the caudal extremity, these bristles being often as long as the head and body together and being held conspicuously raised during progression. In the very young larva the number of bristles is only two but in older larvæ it is four. Besides these the body and head are armed with stout sub-clavate spines, six or eight on each of the thirteen segments. The head is large with well developed mouth parts. There are no footlike processes on the first two thoracic segments but the next three segments have small processes or "sucking discs" (Grassi) and the next four have large ones. The last abdominal segment has a large oval bifurcated process. The larva progresses by looping movements. The pupa is curved, yellow and from 2 to 5 millimetres in length. The last three segments are enveloped in the wrinkled, brownish larval skin which serves as a means of attachment and makes it very easily recognisable (Grassi). When stimulated by touch, light or chemicals it carries out rapid antero-posterior movements; otherwise it is almost motionless. Figures of the eggs, larvæ and pupæ will be found in the articles referenced at the end of this section. According to Howlett the whole period of the life history from the laying of the egg to the emergence of the fly from the pupa takes at Pusa in Bengal about one month in the hot weather and two months or more in the cold weather. In Captain Marett's breeding experiments in Malta the period was more than two months.

Prevention.

Captain Marett suggests the following measures for suppressing the breeding places of *Phlebotomus*: The removal of all unnecessary walls and the use instead of wire fencing for boundaries. Where walls are necessary they should be carefully faced with cement. Embankments should have all the stones well rammed home and the surface should be covered with a sufficient and smooth layer of earth planted with aromatic weeds such as thyme and pennyroyal which apparently are antagonistic to the insects. The ramparts of old defences which cannot be removed should be cleared of the plants growing in crevices and should be properly faced. Caves and disused mines should have all entrances and communications closed, and subsoil drainage shafts should be guarded with wire gauze of very fine mesh. For lowering the incidence of sandfly fever he mentions (*a*) the trapping of the adult insects, which he considers is hardly feasible, (*b*) the spraying of barrack rooms with formalin solution, (*c*) the early removal of patients to hospital and their protection with fine meshed nets; this he says is very hard to achieve, (*d*) protection from bites by the use of aromatic ointments, (*e*) "acclimatization" by which is understood that new-comers should not be housed in barracks noted for the prevalence of sandflies.

Newstead fears that the task of suppressing phlebotomi will prove almost insurmountable especially because adequate measures for the destruction of breeding grounds must include the replacing of all old walls by new ones built of solid masonry from the foundation to the topmost layer. He considers that it would not be practicable to attempt to suppress breeding places in the facings of old fortifications and

similar buildings. He notes also that although up to the present there is no evidence that the flies breed in the cellars and drains at Malta, the observations of Grassi in Italy and of Howlett in India must not be neglected and he thinks it highly probable that the flies breed in similar situations in Malta. He states also that it is obvious that any operations which will not bring about an almost complete destruction of breeding grounds are not likely to make an appreciable reduction in the numbers of the insects, and taking all these and other facts into consideration he concludes that at present the only really practical prophylactic measures which can be taken are those which aim at preventing the bites of the adult insects.

Mediterranean fever; Kala-azar.

9. Only one case of Mediterranean fever and one of kala-azar were recorded among European troops in 1910. The case of Mediterranean fever occurred at Rawalpindi and the case of kala-azar at Allahabad.

Enteric fever in 1910.

10. The statement in the margin shows at a glance the numbers of admissions to hospital and of deaths and the rates per thousand of average strength, recorded from enteric fever among European troops in India during each of the last five years. In continuation of the remarks made in this paragraph in last year's report it is noteworthy that the admission rate in 1910 was lower than in any year since 1878 and the death rate was the lowest ever recorded. The average number constantly sick was less than half the number in 1909 and the total loss of service due to the disease was less by 27,620 days. The case mortality also continued to decline remarkably, being only 11 per cent as compared with 14 per cent in 1909 and 17 per cent in 1908. In this calculation of the fatality of the disease the patients who were already in hospital on January 1st of each year are included.

Years.	Admissions.	Deaths.
1906 ...	1,095 *15·6*	224 *3·19*
1907 ...	910 *13·1*	192 *2·77*
1908 ...	1,001 *14·5*	190 *2·76*
1909 ...	639 *8·9*	113 *1·58*
1910 ...	335 *4·6*	46 *·63*

In the Northern Army the admission rate for 1910 was 5·0 per thousand and the death rate ·58 per thousand; in the Southern Army the rates were 4·5 and ·74 respectively. As regards Divisions the incidence of the disease was greatest among troops in the 2nd (Rawalpindi) and 5th (Mhow) Divisions and least among troops in the 10th (Burma) and 4th (Quetta) Divisions. The death rates in all except one of the Divisions and the admission rates in all except three of the Geographical groups were lower than in 1909.

The statistics of stations are remarkable for the increase in the number of stations in which no case of enteric fever was recorded and for the decrease in the number in which comparatively high admission rates occurred. Of the 89 stations from which statistics were received there were no fewer than 30 in which no new case of enteric fever was recorded during the year and there were 15 stations in which only one new case was recorded. The largest numbers of cases occurring in stations were only 18 in Sialkot, 17 in Rawalpindi and 16 in Poona, these numbers being very different from those of any previous year.

Of the 335 cases and 46 deaths recorded during the year 148 cases with 24 deaths occurred in soldiers who had not been inoculated previous to the attack and 187 cases with only 19 deaths occurred in soldiers who had been previously inoculated. It will be seen from the statistics given later in this report that the number of inoculated men in the European Army of India is considerably greater than the number of uninoculated. Complications, especially hæmorrhage and perforation, were considerably less frequent among the inoculated than among the uninoculated patients.

Reports by medical officers and references to the literature for the year.

11. Six pages of last year's report were devoted to a discussion of the causes of the remarkable decline of enteric fever which has occurred among European troops in India, and a sufficient explanation of the position revealed in the current statistics is contained in the statement that the measures then described were even more thoroughly and extensively applied in 1910. We may therefore proceed at once to give, as usual, an account of the scientific work upon the disease done by medical officers during the year, interweaving with it the customary references to the relevant observations made

in other countries. The latter must be curtailed as much as possible this year because a considerable amount of space has been taken up by the account of sandfly fever.

The bacilli.

It was noted in last year's report that the more general application of bacteriological methods in diagnosis had shown that quite a number of cases of enteric fever among troops in India are due not to the true *Bacillus typhosus*, but to allied bacilli of the paratyphoid group. During 1910 further evidence upon this subject, which is of great importance especially from the point of view of a just appreciation of the value of preventive inoculation, was collected. Owing to the rule that cases can be recorded in the statistical returns as paratyphoid fever only when the bacillus has been isolated, the number of cases appearing under the heading in the statistical returns for 1910 was only 39, but from the additional information given in the text and chronological statements of the annual reports it seems that the number of paratyphoid cases which really occurred during the year was at least 59 or 17·6 per cent of the total number of cases of enteric fever recorded. Even this number is probably much below the true number, because, according to the medical officer in charge of the convalescent depôt at Naini Tal, the cases of at least 100 of the 239 patients transferred to that depôt during the year were probably paratyphoid fever of type A although only 24 of them had been so recorded. Of the 59 cases about which definite information is available 50 were said to be due to the paratyphoid bacillus of type A and 9 to the bacillus of type B. Compared with the experience in other countries the high proportion of paratyphoid infections and the much greater frequency of cases due to the bacillus A than to the bacillus B are very noteworthy, and to account for the first of these peculiarities some medical officers have conjectured that preventive inoculation with a *typhosus* emulsion may have reduced the prevalence of true typhoid fever without affecting that of paratyphoid fever. The second peculiarity was first brought to notice during the enquiry into enteric fever in India carried out by the staff of the Central Research Institute in 1906. The cases recorded as paratyphoid fever during 1910 occurred in 7 stations, of which Benares with ten, Lucknow with nine, Manora Camp (Naini Tal) with eight, Fyzabad and Jubbulpore with five in each were those at which most cases were so diagnosed. The outbreak at Benares was interesting because it was in all probability due to a patient whose illness had been recorded under the heading pyrexia of uncertain origin. It appears that some men of the Middlesex regiment returned to Benares from Kailana on the 14th of July and that a few days later one of them (Private K.) was admitted to hospital on account of fever which was diagnosed as pyrexia of uncertain origin. He was discharged to duty on August 5th. From August 17th several more cases of a similar nature began to occur, and when the Sanitary Officer of the Division visited the station early in September he made cultivations from the blood of four patients whose illnesses had been recorded under the headings pyrexia of uncertain origin or " not yet diagnosed " and from the blood of two of the patients the paratyphoid bacillus A was isolated. Subsequent examinations by Widal's test of blood specimens from all the convalescents in hospital led him to the view that eight men had suffered from paratyphoid fever. These men were therefore sent to the convalescent depôt at Naini Tal where it was found that the first patient (Private K.) was excreting the paratyphoid bacillus of type A in his fæces and was a chronic carrier of this bacillus. Another instance in which a case diagnosed as pyrexia of uncertain origin was afterwards found to be due to the paratyphoid bacillus type A occurred at Taragarh. An officer in that station had continuous fever for six days and on the 9th day the Widal reaction to the *Bacillus typhosus* was negative. His case was diagnosed as pyrexia of uncertain origin, but he subsequently developed severe thrombosis of both femoral veins and on the blood being again examined for the Widal reaction with reference to the paratyphoid bacillus A, positive results in dilutions up to 1 in 160 were obtained on two occasions. These results indicate the advisability of making still further efforts to ascertain the cause of cases diagnosed as pyrexia of uncertain origin, and partly with this object a memorandum upon bacteriological methods of diagnosis has recently been circulated by the Principal Medical Officer, His Majesty's Forces in India.

In connection with the finding that cases of paratyphoid fever due to the bacillus of type A are so frequent in this country considerable interest attaches to any account of the symptomatology and morbid anatomy of cases in which that bacillus has been found, and it is therefore unfortunate that, as usual, the paratyphoid literature of the year is almost entirely confined to articles upon outbreaks due to the bacillus of type B which would appear to be an infrequent cause of disease in India.

Some of the cases occurring in this country, however, have been carefully described by Major Harvey, R.A.M.C.,[1] and by that officer and Major Grattan, R.A.M.C.,[2] and for accounts of outbreaks and cases in other countries we may refer to articles by Poggenpohl,[3] Baermann and Eckersdorff,[4] Faroy,[5] Monnier and Riberau,[6] Purjesz[7] and Aoki.[8] From these accounts it appears that as a rule the symptomatology of the disease is remarkably like that of true typhoid fever and that the isolation of the bacillus is the only sure method of making the diagnosis.

Most of the few cases reported as being due to paratyphoid bacilli allied to type B clinically resembled enteric fever, but one of them was definitely an acute gastro-enteritis caused by "food poisoning". It was a fatal case at Dalhousie, the illness being the result of eating meat which after cooking had been laid aside for twelve hours or more. The chief symptoms were severe diarrhœa, low fever and collapse; death occurred four days after admission to hospital. At the *post mortem* examination the stomach and intestines were found to be intensely inflamed and the lymph follicles much swollen and beginning to ulcerate. From the fæces a bacillus was isolated which was proved by cultural and animal experiments made at the Central Research Institute to belong to the group of meat-poisoning bacilli and to be very virulent for guineapigs. In the literature for the year two classes of cases due to baccilli allied to type B were also recorded, namely those in which the illness was very similar to typhoid fever and those in which the symptoms indicated acute gastro-enteritis. In the first class were cases described by Gram[9] and by Hoskins[10] and in the second were outbreaks described by Bainbridge and Dudfield[11], Trommsdorf, Rajchmann and Porter[12], Aumann[13], Hilgermann[14] and others. Upon the much debated problems connected with the bacilli which cause the two kinds of disease and upon those connected with the very similar bacilli which have been found by German workers to be so widely distributed in nature the views of some English workers are contained in articles by Savage[15] and by Bainbridge and O'Brien[16] and of German workers in a recently published book by Hübener[17].

Bacteriological methods of diagnosis.

The tables giving the results of the employment of bacteriological methods of diagnosis in the Divisional laboratories have been omitted from the abstracts from the Annual Reports of Divisional Sanitary Officers for 1910 and we must therefore rely upon the chronological tables accompanying the reports by medical officers of station hospitals for information of the extent to which during the year under review these methods were used in the diagnosis of enteric fever. From those tables it appears that the method of direct blood culture for the diagnosis of the disease was employed in at least 46 cases of enteric fever reported during the year and that a positive result was obtained in 35 cases or 76 per cent. A number of the tests were not made until about the middle of the second week of the illness so that this percentage must be regarded as a high one and as indicating the great value of this method of diagnosis. The technique of the method and the results obtained by different workers have been described in previous issues of this report and there is very little to be added this year. Klodnitzky[1] has pointed out again the great value of the method for the diagnosis of diseases other than those due to the *Bacillus typhosus* and Kathe[2] has compared the value of the method with that of the research of the fæces, the urine and the secretion from the tonsils. Kirstein[3] who in 1909 published a method of cultivating the bacillus from the blood clots in specimens taken for the purposes of a serum test has reported that during 1910 he obtained a positive result in 20 per cent of the specimens taken in the first week of typhoid fever and in 13·5 per cent of specimens taken in the second week. The more general employment of the method of direct blood culture for the diagnosis of cases of typhoid and paratyphoid fevers among European troops in India has recently been recommended by the Principal Medical Officer and he has suggested that the best cultivating medium is that containing taurocholate of soda.

The results of the Widal test as an aid to diagnosis are available for 306 of the 335 cases of enteric fever which occurred during the year and it appears that in 269 cases or 87·9 per cent a positive reaction was obtained. The test was positive in 90 per cent of the patients who had been inoculated previous to their attack of enteric fever and in 84·7 per cent of those who had

not been inoculated previous to the attack. Several of the Divisional Sanitary Officers drew attention to the sources of error in the test and especially to the fact that in persons who have been inoculated reliance cannot be placed upon the test unless it is repeated several times during the illness. The Sanitary Officer of the 5th Division recorded the following results of the test on 51 healthy men who had been inoculated from a few months to several years previous to the application of the test: Five tests of blood from healthy persons inoculated during the current year, all positive, in dilutions from 1 in 160 to 1 in 200; six tests on healthy persons inoculated in 1909, all positive in dilutions up to 1 in 80; nineteen tests on healthy persons inoculated in 1908, fifteen positive in dilutions from 1 in 40 to 1 in 80 and four negative; twenty tests on healthy persons inoculated in 1907, sixteen positive in dilutions from 1 in 40 to 1 in 80 and four negative. At the convalescent depôt of Naini Tal a considerable amount of work was done by Major Harvey, R.A.M.C., on the value of the test for the diagnosis of paratyphoid fever type A. The chief conclusions were: (1) In cases proved to be due to the *B. paratyphosus* A it is exceedingly rare to obtain as the result of a Widal test a positive reaction for the *B. paratyphosus* A accompanied by a negative reaction for the *B. typhosus*. (2) Less rarely the result is obtained that the reactions to both those bacilli are so slight and transient as to be of little significance. (3) The usual finding is for the reaction for the *B. typhosus* to be higher than for the *B. paratyphosus;* and the reaction as regards the latter bacillus may be present in only a dilution of 1 in 20 or 1 in 40. Even in those dilutions the reaction may not be positive until nearly the end of the fever stage or during convalescence and as a rule it becomes negative after a few weeks. (4) The group agglutinins for the *B. typhosus* also disappear rapidly and for this reason it sometimes happens that the result of a Widal test carried out a few weeks after a patient has passed through a severe attack of paratyphoid fever is entirely negative. Major Harvey's results indicate that the Widal test as usually carried out cannot be relied upon for the diagnosis of paratyphoid infections, a view which is in accord with that of nearly all who have worked at the subject. The most important article in the literature of the year is that by Lüdke [4]; it includes an account of Pfaundler's *Fadenreaction* and the results obtained with regard to it by Mandelbaum and others.

As a diagnostic method the bacteriological examination of the excreta is now used only very rarely, but it is extensively employed for the discovery of bacillus carriers. At the convalescent depôt of Naini Tal during 1910, the urine and fæces of 253 enteric fever convalescents were examined 14 or more times for that purpose, the total number of samples dealt with during the year being 3,374 of fæces and 3,219 of urine. Three of the 253 soldiers examined were found to be excreting the *B. typhosus* in their fæces and five the *B. paratyphosus* of type A, but in two of the latter cases the bacilli were found on only one occasion. Typhoid or paratyphoid bacilli were not found in the urine of any case. The report on the Wellington convalescent depôt states that the fæces and urine of 133 men were examined for the discovery of carriers during the year and that four chronic carriers of the *B. typhosus* were discovered. At both depôts the original Drigalski Conradi medium is the one in ordinary use, but at the Naini Tal depôt, an extensive trial was made during the year with the Fawcus modification of Conradi's brilliant green medium. The following conclusions were recorded in Major Harvey's report: (1) The medium is expensive owing to the large amount of peptone necessary. (2) It inhibits *coli*, but does not entirely prevent their growth; for this reason small *coli* colonies are numerous and difficult to differentiate. (3) It also inhibits typhoid colonies and when the same sample of fæces is planted on it and on Conradi's blue medium the typhoid colonies on the latter are, after 24 hours, more numerous, larger and more characteristic than on the former. (4) On this medium it is difficult to differentiate between colonies of bacilli of the typhoid group and colonies of other non-lactose fermenting bacilli which are common in fæces. Padlewski's medium was also tried and Major Harvey reported that it is a good medium especially for experimental work, but that it is more expensive to prepare in large quantities than the original Conradi medium. Comparative studies of the value of these and other media will also be found in recent articles by Bitter [5], and by Schröder [6] and a useful summary of the whole subject is contained in Dr. Ledingham's report upon "the enteric fever carrier" [7].

Epidemiology. Bacillus carriers.

Since the issue of last year's Annual Report of the Sanitary Commissioner with the Government of India the publication by the Local Government Board in England of an exhaustive review of the literature dealing with enteric fever carriers[1] has rendered it unnecessary to continue in such detail as has been customary; the summary of available information upon the subject which since 1904 has appeared annually, and for the present year it will suffice to recommend a study of that easily accessible review and to record as usual the work done by medical officers in India.

During the year under review the total number of convalescents examined at both the depôts was 386, each man being examined as a rule about fourteen times, namely, three or four times as soon as possible after his arrival at the depôt and then daily for a fortnight six weeks or two months later. In view of the results recorded in 1908 by the committee for the investigation of enteric fever in India [2] it is probable that the number of examinations might be increased with advantage, but it is as many as can at present be accomplished and it is highly satisfactory that the result was the discovery of ten chronic carriers. The figure gives a percentage of 2·5 which, having regard to the knowledge that no women are included, is not a low one. All the carriers found during the year were excreting the bacilli in their fæces only. It is especially interesting that of the six carriers detected at the Naini Tal depôt no fewer than three were carriers not of the *B. typhosus* but of the *B. paratyphosus* type A, and this indicates the great importance of that form of enteric fever in this country. In the literature for the year there appears to be only one record of the finding of a chronic carrier of the paratyphoid A bacillus, namely, a record by Aoki[3]. All the chronic carriers detected at the Naini Tal depôt gave a history of having suffered from symptoms indicating the presence of cholecystitis or cholelithiasis. The association between the carrier state and gallstone disease is one of the subjects fully dealt with in Dr. Ledingham's comprehensive review already mentioned and a few articles which have appeared since that review was written are referenced at the end of this section.[4]

The detection and segregation of the ten carriers found during the year undoubtedly prevented the occurrence of a great many cases of enteric fever, and if any proof of this is necessary it is sufficiently afforded by the knowledge that even during the short period prior to their detection at least two of the chronic carriers caused outbreaks of enteric fever in their regiments, namely, the outbreak at Benares which has been described in a previous paragraph and an outbreak of eight cases at Manora camp. The latter was shown to be due to a paratyphoid carrier who had been employed as a cook-orderly within six weeks of his having suffered from a continued fever not at that time diagnosed as enteric fever.

The treatment of carriers was a subject to which much attention was directed at the Naini Tal depôt and Major Harvey considered the results obtained by treatment with vaccines encouraging. He pointed out the importance of commencing this mode of treatment at the earliest possible period, that is before the nests of bacilli in the wall of the gall bladder have become enclosed by inflammatory tissue which prevents the protective substances in the blood from acting upon them. The case of a chronic carrier treated, apparently successfully, by a specific vaccine at the Wellington depôt was reported in detail by Major Clements and Captain Dawson, R.A.M.C.[5]

Modes and vehicles of spread.

Enquiries with the object of ascertaining the source and mode of infection were, as usual, carried out as regards nearly every case of enteric fever reported during the year, and in most stations they were conducted with a view to discover not only the particular vehicle by which infection was conveyed but the responsible human host. The investigations made for the latter purpose often included the examination by Widal's test of large numbers of contacts, cook-house attendants and other healthy persons, but with the noteworthy exception of cases definitely traced to chronic bacillus carriers at Benares, Manora camp and Meerut and a few cases in which infection by direct contact was traced with some probability the results were negative. In most cases the result was similar with regard to the enquiries to ascertain the particular vehicles by which infection was spread, and this is not surprising in view of the great difficulties attending

such enquiries in a country like India where, at the present time, enteric fever seldom or never prevails in epidemic form. In recording the few instances in which medical officers were able to name with some probability the manner or the vehicle of infection, the opportunity will be taken to note a few recently published papers upon various modes of spread of the disease.

Infection by contact, either direct or indirect, is undoubtedly the most frequent manner in which enteric fever is contracted among European troops in India and during 1910 it was put forward to explain the occurrence of cases at Jubbulpore, Wellington, Poona, Kamptee, Benares, Multan, Meerut, Lahore Cantonment and Rawalpindi. A proved case of infection by direct contact occurred in the person of a nursing orderly at Kamptee and at the same station two interesting examples of infection by indirect contact through the medium of soiled blankets resulted from the use by a soldier who was in the incubation stage of enteric fever of blankets borrowed from his comrades. Several medical officers drew attention to the danger which arises from the practice adopted by some soldiers of not reporting sick until they are unable any longer to continue their duties, and a group of cases at Rawalpindi were believed to be due to a soldier who had followed this foolish course. One of the patients at Secunderabad had been ill for three weeks before seeking admission to hospital and another for twelve days. Both those patients died. By the lectures upon enteric fever which are given to soldiers in many stations an endeavour is made to spread the knowledge that the danger of not at once reporting sick is as great to a soldier's comrades as to himself, but there is much evidence that as regards both enteric fever and malaria the warning still in many cases passes unheeded.

It has always been recognised in India that one of the most important modes of infection by indirect contact is through the medium of infected latrines, and in the literature for the year a valuable report by Wheaton[1] is of great interest in this connection. This mode of spread of the disease has become less frequent among European troops in India since the general adoption of the "wet system" in latrines.

Excepting the conjecture that one case at Jubbulpore and another at Jutogh might have been due to drinking infected water, no medical officer attributed a case to that medium during the year. The rarity of water-borne enteric fever has been generally recognised in India for many years and in recent times the view has spread to other countries. The change of opinion is due partly to more accurate knowledge of the usual modes of spread of the disease but chiefly perhaps to the fact that the great extension of modern arrangements for water-supply and sewage disposal has reduced the frequency of explosive and widespread epidemics, with the result that greater attention has been directed to the endemic form of the disease which as a rule is spread not by water but by direct or indirect contact. This was illustrated during the year in articles by Johnstone, Wheaton and others[2]. It must not be forgotten, however, that in places where good arrangements for water-supply are absent or where the arrangements break down, water-borne epidemics occur not less frequently than formerly, as is shown, for example, in the account by Simond of an epidemic of 91 cases in a reformatory school[3] and in Dybowski's account of an extensive epidemic in Altwasser.[4] In the latter there were 702 cases of which 147 occurred during the first week, 206 during the second and 122 during the third, thus showing clearly the explosive type which is characteristic of water-borne outbreaks.

No definite outbreak in India was reported to have been due to milk during 1910 and only a few medical officers referred to it as a probable cause of cases. During recent years, however, milk has come to be regarded generally as the most important of the different vehicles by which infection is conveyed and the literature for the year contains, as usual, a number of interesting examples of outbreaks and cases due to it. A list of them is given at the end of this section.[5]

The only other foods which were specially named in the annual reports as having been the probable vehicles of infection were uncooked fruit at Ranikhet and Kasauli, lettuce or watercress salad at Colaba and oysters at Ahmedabad, but in several stations it was thought on good grounds that food purchased in bazars or from native hawkers, or consumed in eating-houses, was the responsible vehicle. Three non-commissioned officers at Ambala were thought to have contracted the disease at a masonic banquet.

There were fewer references than usual to the possible rôle of flies as carriers of the disease and two of the Divisional Sanitary Officers failed to confirm the findings reported by Major Faichnie, R.A.M.C., last year. An enquiry into the rôle of flies as carriers of disease is being conducted on behalf of the Local Government Board in England and the three reports already published should be carefully studied.[6]

Preventive inoculation.

The material and methods for anti-typhoid inoculation among European troops in India have been greatly improved during recent years and considering that the measure is entirely voluntary, the efforts to popularize it have been attended with great success. In the autumn of 1910 a new plan of collecting accurate information of the results was introduced and in the report for that year the statistics collected at the quarterly census taken on the 30th September were summarized. The following table gives similar information collected on the 30th June 1911 :—

Arms of the Service.	Total men present on the day this census is taken.	Total present who have been properly inoculated at any time before the day this census is taken.*	Total present who have been inoculated and not afterwards attacked.†	Total present who have been inoculated but afterwards attacked.†	Total present who are uninoculated and unattacked.	Total present who are uninoculated but have been attacked.
1	2	3	4	5	6	7
Cavalry	4,891	3,464	4,037	158	585	111
Royal Field Artillery	7,596	5,150	6,214	104	1,036	242
Royal Garrison Artillery ...	4,130	2,133	2,951	28	1,031	120
Royal Horse Artillery	1,868	1,241	1,489	41	271	67
Ammunition Column	854	511	632	13	165	44
Royal Engineers	116	39	41	1	69	5
Infantry	50,227	36,257	44,669	667	4,220	671
Staff and Departments	2,056	660	918	13	1,023	102
Attached Corps	367	215	272	4	81	10
India ...	72,105	49,670	61,223	1,029	8,481	1,372

* By properly inoculated is meant that the man has received two or more doses of vaccine; men who have received only one dose are excluded from this column.

† In these columns men who have received only one dose of vaccine are included.

It will be seen that especially in some branches of the army the proportion of inoculated men is very high; indeed it appears from the annual reports that in quite a number of regiments almost every man has been inoculated. The data at present collected are such as to enable the correlation coefficients between inoculation and freedom from attack and between attack and recovery to be worked out by the "four-fold table" method described by Professor Pearson and on the data for various periods and for the whole of 1910 this has been done by Colonel Firth, R. A. M. C.,' Sanitary Officer, Army Headquarters. Colonel Firth found that as regards both freedom from attack and recovery after attack the coefficients of correlations were definitely positive. As regards the correlation between inoculation and freedom from attack the mean value of r calculated from the very similar results in a number of tables for different units and periods was

0·2486±0·0091 and between inoculation and recovery from attack it was 0·7615± 0·0451. The former of these values is not so high as might have been expected, but Colonel Firth points out that this is probably due to the fact that the attacked group included a number of cases of paratyphoid fever the great prevalence of which in India is only just beginning to be realised. Other valuable evidence in favour of inoculation will be found in the report of a commission recently appointed by the Paris Academy of Medicine[2] and in papers by Leishman, Hartsock, Foster, Gosman and others [3].

Plague and some other diseases.

12. Among European troops in India there were only two cases of plague with one death during 1910 as compared with five with one death in 1909. The cases occurred at Mhow and Kamptee in both of which plague was prevalent among the native population living in the neighbourhood of the European troops. At Mhow five cases had occurred in the syce lines and plague infected rats had been found. Both cases among the European troops were of the bubonic variety, the bacillus of the disease being found in the secretion from the enlarged glands. The patient at Kamptee died. Measles caused 13 admissions to hospital and erysipelas 14, none of the cases being fatal. Only six admissions were recorded as due to beri-beri, two at Rangoon, one at Poona, one at Cawnpore and two from the line of march. Rheumatic fever was responsible for 383 admissions to hospital and three soldiers were invalided for this disease.

Tubercle of the lungs.

13. The steady decline in the admissions and deaths from tubercle of the lungs which had been continuous since 1903 was interrupted in 1910 by an increase from 81 to 106 in the admissions, from 9 to 17 in the deaths and from 66 to 71 in the invaliding. There were 60 cases in the Northern Army and 46 in the Southern. The largest number of cases in any station was seven in Quetta and there were five in Kasauli and Agra. Very few medical officers mention the disease in their annual reports.

Pneumonia.

14. The admission and death rates from pneumonia in 1910 were 2·0 and ·25 per thousand respectively as compared with 2·9 and ·31 in 1909, the total numbers of admissions and deaths in each year being 144 and 18 in 1910 and 209 and 22 in 1909. The disease was considerably more prevalent in the Northern than in the Southern Army and comparing its relative incidence with that in 1909 it was less prevalent in eight of the geographical groups and more so in four. Excluding stations where the average strength was below 200 Peshawar (admission rate 6·1 per thousand), Fyzabad, Lahore, Dinapore and Lucknow were the stations with the highest admission rates during 1910.

Respiratory diseases.

15. There was a very slight increase in the admission rate on account of respiratory diseases (among which pneumonia is not now included) from 12·8 per thousand in 1909 to 13·0 and the number of deaths rose from seven to twelve. The stations classed as hill convalescent depôts and sanatoria were those in which the diseases were most frequent. Of the deaths three were due to bronchitis and two each to broncho-pneumonia, asthma, and abscess of the lung.

Dysentery and Diarrhœa.

16. The admission and death rates from dysentery fell from 11·2 and ·25 per thousand in 1909 to 7·7 and ·23 in 1910. The death rate was higher in the Northern than in the Southern Army. The disease was most prevalent among troops in the 6th (Poona) and 5th (Mhow) Divisions and among geographical groups the highest admission rates were recorded in groups IX, X and XI. For the European army as a whole the month of greatest prevalence was July and that of least prevalence December.

There were 807 non-fatal cases of diarrhœa as compared with 558 cases with 17 deaths on account of dysentery. The admission rate was highest amongst troops in the North-West Frontier geographical group and among the larger stations Peshawar, Quetta and Lucknow were those at which the disease was most prevalent.

Hepatic abscess.

17. Next to enteric fever hepatic abscess is the most frequent cause of death among European troops, but the admissions and deaths on account of it have decreased greatly during recent years. In 1910 it caused 75 admissions to hospital and

35 deaths as compared with 100 admissions and 34 deaths in 1909. There were more cases and deaths in the Northern than in the Southern Army and the largest numbers of cases in stations were eight in Kasauli, five in Jubbulpore and four in Ambala. At the *post mortem* examinations on the 35 fatal cases dysenteric ulceration of the large intestine was found in eleven. Multiple abscesses of the liver were present in more than half the cases. Several medical officers recorded that the men attacked with this disease were heavy drinkers and in this connection it is not out of place again to draw attention to the point noted in last year's report that the steady yearly decrease in the number of cases of liver abscess is coincident with an equally steady fall in the number of admissions to hospital for alcoholism. From the figures in the margin it will be seen that in 1910 there were only 37 admissions to hospital for this cause and carrying the comparison to earlier years than 1906 it may be noted that in 1905 there were 197 admissions and that the annual mean number of admissions for the years 1900 to 1904 was 231.

	Total admissions.	
	Abscess of liver.	Alcoholism.
1906	183	170
1907	165	94
1908	115	71
1909	100	65
1910	75	37

Venereal diseases.

18. The remarkable reduction of venereal diseases among European troops in India is an example of the results of earnest co-operative effort not only between combatant and medical officers, chaplains, the authorities of the Royal Army Temperance Association and other civilian officials, but between all these and the men themselves. In 1910 the admission rate for all diseases under the heading was only 58·9 per thousand as compared with 67·8 in the previous year, only one death was recorded and only 25 men had to be invalided as compared with 34 in 1909. The admission rate among troops of the Northern Army was 54·4 per thousand and among troops of the Southern Army it was 64·7, the difference in these two rates being considerably less than usual. As regards Divisions, the admission rates were, as usual, highest among troops in the Secunderabad and Burma Divisions. Among the stations of the Northern Army the highest admission rates were recorded in Fyzabad, Cawnpore and Allahabad and among those of the Southern Army at Poonamalee, Meiktila and Colaba.

The system of continuous treatment which has been so effective in preventing relapses was further improved during the year by being carried out at selected stations to which all patients able to travel were transferred. The methods of treatment adopted were the same as in previous years but it is understood that since the close of the year a number of trials with "salvarsan" have been made. The Wasserman test for syphilis was employed successfully in several stations, notably Poona, Barian and Mhow.

Heat Stroke.

19. The total number of deaths recorded as a result of heat stroke during 1910 was only seven as compared with fifteen in the previous year and 37 in 1908. Mooltan (2), Agra, Ambala, Jullundur, Lucknow and Aden were the stations at which deaths from this cause occurred.

Suicide.

20. The mean annual number of suicides reported in the decade, 1897 to 1906, was 20 and in 1910 the number was eleven of which nine were by gunshot, one by hanging and one by cut-throat.

Invaliding.

21. From the European army of India 563 men were invalided in 1910 (8 per thousand of strength) as compared with 649 (9 per thousand) in the previous year. In the Northern Army the rate was 8·00 per thousand and in the Southern Army it was 8·01 per thousand. The principal diseases for which invaliding was necessary have already been mentioned in the first paragraph of this section. Of the total number of men invalided 84 per cent were under 30 years of age and 74 per cent had been less than five years in India.

22. The average strength of commissioned officers with European troops in India during 1910 was 2,365 and among them there were 1,355 admissions to hospital, 44 were invalided, and 17 died during the year. The admission, constantly sick and death rates were lower than in 1909, but the invaliding rate rose from 17·86 to 18·61.

Officers.

Malaria was the disease which caused most admissions to hospital but the admission rate was much lower than among the men. There were in all 22 admissions from enteric fever with three deaths, the admission rate (9·3 per thousand) being the lowest on record, but twice as high as among the men. The 22 cases were spread over sixteen stations. It is unfortunate that exact particulars regarding inoculation of officers are not in many cases given in the annual reports, but it is known that of the officers who suffered from enteric fever in 1910 fourteen had been inoculated and one had not. As regards the remaining seven patients information about inoculation was not given. In a number of the cases the date of inoculation was several years before the attack. No new case of cholera occurred during the year but there was one non-fatal case of plague and one of small-pox. A noteworthy feature of the statistics is the absence of any admission on account of venereal disease.

Debility, dysentery, malaria, enteric fever and neurasthenia were the chief causes of invaliding.

23. The average strength of the women during 1910 was 4,137, an increase of 224 on that of the previous year. The statistics of health were very favourable, the rates of admission to hospital and of death being 504·7 and 6·28 per thousand, respectively, as compared with 596·7 and 7·67 in 1909. The constantly sick rate was 21·6 as compared with 24·3. From all causes 44 women were invalided during the year, twelve of them on account of malaria.

Women.

The chief causes of admission to hospital were, as usual, anæmia and debility, diseases peculiar to women, and malaria, which together accounted for 60·39 per cent of the total number of admissions from all causes.

On page 27 of last year's Annual Report of the Sanitary Commissioner with the Government of India, the coincidence was pointed out that for the first time in the history of enteric fever in India the admission rate for this disease among the women was higher than among the men and the death rate was very nearly as high. In 1910 the statistics afforded further evidence of this noteworthy change of relative incidence, for although both the admission and the death rate among the women were lower than in 1909 they were both considerably higher than among the men. The position is clearly shown in the marginal statement. Information as to whether ten of the 27 women who suffered from the disease during 1910 had been inoculated or not is absent from the annual reports, but of the remaining 17 patients it is definitely stated that 16 had not been inoculated and that one had been inoculated. The medical officer at Secunderabad stated that it is very difficult to persuade the women to be inoculated and the medical officer at Dagshai that the woman who contracted the disease there had repeatedly refused the operation. It appears from these figures and remarks as well as from the figures given in last year's report that exceedingly few women of the European army have been inoculated and that for this reason the remarkable change of relative incidence already noted affords a good proof of the great value of the measure. A similar proof has long been in existence of the value of vaccination and re-vaccination against small-pox, for it is well known that whatever may be the condition of the women of the European army in regard to vaccination in infancy, successful re-vaccination in adult life is rare, and that for this reason it is an invariable rule for the incidence of small-pox among the women to be much higher than among

Relative incidence of enteric fever among men and women of the European Army in India. Admission and death rates per 1,000 of strength.

Years.	Admission rates.		Death rates.	
	Men.	Women.	Men.	Women.
1905 ...	16·1	8·6	3·00	1·48
1906 ...	15·6	7·3	3·19	1·46
1907 ...	13·1	8·9	2·77	1·72
1908 ...	14·5	13·3	2·76	1·89
1909 ...	8·9	10·2	1·58	1·53
1910 ...	4·6	6·5	·63	1·45

the men. Although only three women suffered from small-pox during 1910 one of them died. She contracted the disease at Colaba very shortly after her arrival from England and had not been vaccinated since infancy. The woman who contracted the disease at Quetta had also been vaccinated in infancy but not subsequently, the reason given being that as her husband had been for many years in civil employment in the Telegraph Department she had not come under the supervision of the military authorities. Of the total number of deaths from all causes (26) among the women six were due to enteric fever, the case mortality being more than twice as high as among the men. No other disease caused more than two deaths.

Children.

24. The admission, constantly sick, and death rates among the children were all lower than in 1909. The strength was 6,678, the admission rate 343·5, the constantly sick rate 14·0 and the death rate 26·95. The chief causes of sickness were respiratory diseases, diarrhœa, debility and malaria which together accounted for 40 per cent of the total admissions. Of the 180 deaths 30 were attributed to diarrhœa, 28 to enteritis, 23 to anæmia, debility, and immaturity at birth, 17 to convulsions, and 16 to respiratory diseases. There were 22 admissions to hospital with one death from enteric fever and 198 admissions with nine deaths from malaria. Among the exanthemata to which children are liable there came under treatment during the year 83 cases of chicken-pox, 81 of measles, 20 of German measles and eight of scarlet fever. There was no case of small-pox. Whooping cough caused 100 admissions to hospital, diphtheria twelve and mumps three.

The strength at different age periods, the death rates per mille and the relative liability to death at each of these periods are shown in Table XXV.* Immaturity at birth was the cause of 9 per cent of the total number of deaths among children under six months of age.

BOOKS AND PAPERS REFERRED TO IN SECTION I.

ABBREVIATIONS USED BELOW.

A. H. = Archives für Hygiene.

A. K. G. A. = Arbeiten aus dem kaiserlichen Gesundheitsamte.

A. P. = Annales de l'institut Pasteur.

A. S. T. H. = Archiv für Schiffs und Tropenhygiene.

B. I. P. = Bulletin de l'institut Pasteur.

B. J. H. H. = Bulletin of the Johns Hopkins Hospital.

B. K. W. = Berliner Klinischer Wochenschrift.

B. M. J. = British Medical Journal.

B. O. I. H. P. = Bulletin de l'office international d'hygiene publique.

C. B. = Centrallblatt für Bakteriologie.

D. M. W. = Deutsche Medizinische Wochenschrift.

H. R. = Hygienische Rundschau.

I. M. G. = Indian Medical Gazette.

J. A. M. A. = Journal of the American Medical Association.

J. H. = Journal of Hygiene.

J. I. D = Journal of Infectious Diseases.

J. R. A. M. C. = Journal of the Royal Army Medical Corps.

K. J. = Klinisches Jahrbuch.

L. = Lancet.

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

L. G. B. = Report of Medical Officer, local Government Board.

M. M. W. = Münchener Medizinische Wochenschrift.

N. = Nature.

P. J. S. = Philippine Journal of Science.

W. P. J. = Jahresbericht of Waldeyer and Posner.

Z. H. = Zeitschrift für Hygiene.

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2. SANDFLY FEVER.—The following books and papers have been consulted for the compilation of this summary: *Das Pappatacifieber* by Doerr, Franz and Taussig published by Deuticke, Leipzig, 1909. Grassi's *Richerche sui Flebotome. Memorie della Societa italiana delle scienze.* Series 3 a Volume XIV, 1907, pages 353 to 394; Austen's monograph of the African blood-sucking flies, British Museum, London, 1909; Howlett in the Proceedings of the Bombay Medical Congress, 1909, page 239, and in Lefroy's Indian Insect Life, pages 557 to 560; Newstead in the Bulletin of Entomological Research, Volume II, Part I, May 1911, page 47; Doerr and Russ referenced in B. O. I. H. P., December 1909, page 1310; Birt in J. R. A. M. C. February 1910, page 142, March 1910, page 236 and August 1910, page 140; Marett in J. R. A. M. C., September 1910, page 286; and July 1911, page 13; McCarrison in I. M. G. January 1906, page 7; Franz and Koter referenced in C. B., Referate, 30th November 1910, page 56; Annandale in Records of the Indian Museum, Volume IV, No. 2, page 35, and Volume IV, No. 7, page 319; also articles and references in B. O. I. H. P., Volume II, No. 7, page 1095, No. 8, pages 1283 and 1284, No. 11, page 1943, C. B., Referate, 14th February 1910, page 514, J. T. M., August 15th, 1910, page 246 and March 15th, 1911, page 96; B.I.P., Volume VIII, September 1910, pages 772 to 773, B. M. J., 15th October 1910, page 1115, I. M. G., 1911, page 41, Report of the Advisory Committee for the Tropical Diseases Research Fund, 1910, page 64.

3. ENTERIC FEVER. *The bacilli.*—[1]Harvey in J. R. A. M. C., April 1910; [2]Grattan and Harvey in J. R. A. M. C., January 1911, page 9; [3]Poggenpohl in Z. H., Volume LVII, page 273; [4]Baermann and Eckersdorff referenced in C. B., *Referate* 18th April 1910, page 234; [5]Faroy in Compt. rend. de la Soc. de Biol. Volume LXIV, page 1093; [6]Monnier and Riberau in Compt. rend. Soc. Biol., Volume LXIX, 1910, page 151; [7]Purjesz in W. K. W., 1910, No. 36, page 1284; [8]Aoki in C. B, *Originale*, Volume LVI, 1910, page 110; [9]Gram referenced in C. B. *Referate*, Volume XLVIII, page 171; [10]Hoskins in J. A. M. A., Volume LIV, No. 12, 1910; [11]Bainbridge and Dudfield in J. H., Volume II, March 1911, page 24; [12]Trommsdorff, Rajchmann and Porter in J. H., Volume II, March 1911, page 89; [13]Aumann in C. B., *Originale*, Volume LVII, *heft* 4, page 310; [14]Hilgermann in K. J., Volume XXIV, *heft* 3, page 338; [15]Savage in L. G. B., 1909-10, page 446; [16]O'Brien and Bainbridge in J. H., Volume II, 1911, page 68; [17]Hübener, *Fleischvergiftungen und Paratyphusinfektionen.* G. Fischer, Jena, 1911.

Bacteriological methods of diagnosis. [1]Klodnitzky in C. B., *Originale*, C. B., Volume LVIII, 1911, page 376; [2]Kathe in C. B., *Originale*, Volume LV, 1910, page 402; [3]Kirstein in C. B., *Originale*, Volume LIX, 1911, page 478; [4]Lüdke in the first supplementary Volume of Kraus and Levaditi's *Handbuch der Immunitäts forschung*, page 518; [5]Bitter in C. B. *Originale*, Volume LIX, *heft* 4, 1911, page 469; [6]Schröder in K. J., Volume XXIV, *heft* 3, page 302; [7]Report on the enteric fever carrier by J. C. G. Ledingham in L. G. B., 1909-10. Wyman & Sons, Fetter Lane, London.

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1911 referenced in J. A. M. A., April 15th, 1911, page 1146; [5]Clements and Dawson in J. R. A. M. C., April 1911, page 420. For other articles upon bacillus carriers published during the year under review see C. B., *Referate*, Volume XLIX, page 233, Neisser in B. K. W., 1910, No. 47, page 2142, Lentz referenced in C. B., *Referate*, 4th May 1911, page 235, Botticher in Z. H., Volume LXVII, 1910, page 243, Johnstone in L. G. B., 1909-10, page 159, Heinemann in Zeitschr. f. Med-Beamte, 1911, No. 1, page 1, Hutchinson in B. M. J., 1910, Volume I, page 746, Sporberg in K. J., Volume 24, heft 3, page 287, Trommsdorff and others in J. H., Volume II, No. 1, page 89, Wilson and Sinton in L., April 15th, 1911, page 1002.

Modes and vehicles of spread.—[1]Wheaton in L. G. B., 1909-10, page 113; [2]Johnstone in L. G. B., 1909-10, page 172, Wheaton as above; [3]Simond in J. A. M.A., April 15th, 1911, page 1100; [4]Dybowski in K. J., Volume XXIV, page 251; [5]See L. G. B., 1909-10, pages 10 and 288, Stott in L. 10th September 1910, page 793, Bohm in M. M. W., 1910, page 2423, Heinemann referenced in C. B., *Referate*, Volume XLIX, page 236, Gaffky in H. R. XXI, No. 5, 1911, page 292; [6]Reports to the Local Government Board on flies as carriers of infection, No. 1, June 1909, No. 2, October 1909, No. 3, August 1910. Wyman and Sons, Fetter Lane, London; see also Parasitology, Volume IV, No. 1, March 1911, page 68 and J. A. M. A., November 19th, 1910, page 1812.

Preventive inoculation.—[1]Firth in J. R. A. M. C., Volume XVI, June 1911, page 589; [2]B. O. I. H. P., Volume III, No. 4, April 1911, page 631; [3]Leishman in Journal of the Royal Institute of Public Health, July to September 1910, Hartsock in J. A. M. A., Volume LIV, 1910, No. 26, Foster in J. A. M. A., 19th November 1910, Gosman in J. A. M. A., Volume LV, 1910, page 1169, Vincent referenced in B. O. I. H. P., Volume II, 1910, page 1721.

INDIAN ARMY.

SECTION II.

25. The average strength of Indian troops, including those on duty in China and other stations outside India, was 131,274 as compared with 131,627 in 1909, and their health was very good.

India.

The chief statistics for the year are given in the marginal statement. Except the constantly sick rate, which was slightly higher than in 1909, all the rates were by far the lowest on record. The death rates shown in the table, however, are misleading because they do not include the deaths of men while on sick leave or furlough at their homes; if those were included the rate for 1910, instead of being 4·89, would be 7·12, which is higher by ·70 than the similar rate for 1909. The admission, constantly sick, and invaliding rates were, as usual, lower than those of European troops, but for the first year of which there is a statistical record the death rate was higher.

Indian troops.	All causes. Ratios per mille.		
	1904-08.	1909.	1910.
Admissions	635·6	584·2	572·8
Constantly sick.	22·9	20·8	21·1
Deaths ...	7·34	5·62	4·89
Invalids ...	8·13	5·74	5·21

The lower rate of admission to hospital as compared with 1909 was due chiefly to a diminished prevalence of malaria, but among the more important diseases the admission rates from dysentery, pneumonia, and influenza were also lower than in that year. On the other hand pyrexia of uncertain origin, respiratory diseases, diarrhœa and venereal diseases were more prevalent. The diminished death rate was due chiefly to fewer deaths from pneumonia and tubercle of the lungs. Plague caused 22 deaths as compared with eight in 1909.

The chief causes of sickness were malaria, pyrexia of uncertain origin, dysentery and respiratory diseases, in order of their relative prevalence; and the principal causes of death were pneumonia, enteric fever and respiratory diseases.

The number of men invalided for discharge from the service was 684 as compared with 756 in 1909, the chief causes of this source of loss being tubercle of the lungs, injuries, venereal diseases and debility.

If Table XI be compared with Table II it will be seen that, according to the statistics, the Indian troops suffered less than the European troops from venereal diseases, pyrexia of uncertain origin, hepatic affections, sandfly fever, diarrhœa, and enteric fever, but that they suffered more from nearly all the other causes of sickness, among the more important being malaria, tubercle of the lungs, pneumonia, respiratory diseases and dysentery.

The statistics of Indian troops located in stations outside India will be found in Tables XXVIII* and XXIX* and the following remarks contain some details not given in those tables. The average strength of the troops serving in China was 2,332, the rate of admission to hospital was 462 per thousand and the death rate only 3·86 per thousand. In North China (Tien-tsin and Chin-Wang-Tao) there was only on regiment, the 76th Punjabis. Tuberculosis was prevalent in the regiment, there being 23 new cases, 17 invalidings and three deaths during the year. The medical officer attributed the spread of the disease partly to overcrowding and defective ventilation in the barracks. In South China (Hong Kong and Kowloon) there were two regiments, the 13th Rajputs and the 105th Infantry. Respiratory diseases and malaria were the chief causes of admission to hospital. The average strength of the troops in Colombo and Singapore was 1,487, the admission rate was 484 per thousand, and the death rate 3·36. In the stations of the Aden Brigade the average strength was 921, the admission rate was 811 per thousand and the death rate 4·34. Among the troops in stations on the Persian Gulf (strength 399) there was no death during the year.

26. The sickness and mortality among the Indian troops of the Northern army were, as usual, much greater than among those of the Southern army, the admission rate per thousand being higher by 151·4 and the death rate by 1·12. The higher admission rate in the Northern army was due entirely to the prevalence of malaria and

Northern and Southern Armies. Divisions.

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

the higher death rate was due chiefly to the mortality from pneumonia and enteric fever. The relative incidence of different diseases among the Indian and European troops of the two armies corresponded except in regard to influenza, cholera, small-pox, dysentery, diarrhœa and hepatic affections. As regards the Divisions, the statistics of troops in the 1st (Peshawar) Division were the least favourable during 1910, the 2nd (Rawalpindi) Division standing next in the list and the 6th (Poona) Division third.

Geographical Groups.

27. For the year under review the geographical areas numbered X (Western Coast) and VII (North-West Frontier) must be considered to have been for Indian troops more unhealthy than the other areas, and this is in accordance with usual experience. Malaria and dysentery were especially prevalent in the first of these groups and malaria in the second.

Stations.

28. In 1910 there were 41 stations in which the average strength of Indian troops was over one thousand. The rates of admission to hospital were very high in six, namely, Dera Ismail Khan, Edwardesabad, Peshawar, Delhi, Jhelum and Kohat, and the death rates were high in Almora, Peshawar, Dehra Dun, Ahmednagar, Edwardesabad and Multan. In Dera Ismail Khan the admission rate was 1,652 per thousand, in Edwardesabad it was 1,342, in Peshawar 1,107, in Delhi 970, in Jhelum 913, and in Kohat 910. In all these stations malaria was the chief cause of the high rate. The highest death rate in any of the larger stations during the year was 9·67 per thousand recorded at Almora, the chief cause of the mortality being enteric fever. Abstracts of the cantonment sanitary reports upon 14 of the most unhealthy stations will be found in Table XXX* so it is unnecessary to refer to them in detail here.

Among regiments with a record of much sickness and mortality during the year were the 116th Mahrattas at Bombay, the 104th Rifles at Santa Cruz, the 2-2nd Gurkha Rifles at Dehra Dun, and the 113th Infantry at Deesa. The admission rates in these regiments ranged between 340 and 871 per thousand and the death rates between 13·41 and 15·74. They will be referred to again in the paragraphs dealing with different diseases.

Cholera.

29. The number of cases of cholera in the Indian army was 21 and the number of deaths twelve as compared with 26 and 18 in 1909. The cases were distributed among sixteen regiments located in thirteen stations, the only regiments with more than one case being the 7th Lancers at Jacobabad (three cases with two deaths), the 52nd Sikhs at Peshawar and Shabkadar (three cases with two deaths) and the 59th Scinde Rifles at Kohat (two cases with one death). The disease was prevalent among the general population in all the stations where it occurred among the troops and the measures taken to prevent its spread in Native regiments were, as usual, very successful.

Small-pox.

30. There were only 22 admissions to hospital on account of small-pox during 1910 as compared with 43 during 1909 and there was only one death as compared with eight. The cases occurred in 17 regiments located in 13 stations of which Kohat, Nowshera, Baroda, Ahmednagar and Quetta were the only ones at which there were two or more cases. The patient who died was a recruit in whom the result of vaccination had been reported as "modified." He was to have been revaccinated, but before the operation was performed he was allowed a few days leave to go to his home. He contracted confluent small-pox there and died on the eighth day.

Malaria.

31. In India as a whole all classes of people suffered less from malaria in 1910 than in the previous year and among the Indian troops the rate of admission to hospital fell from 180 per thousand to 160 and the rate of mortality from ·28 per thousand to ·25. The admission rate represents 20,960 admissions and the death rate 33 deaths. Both rates are the lowest on record, but for reasons which have been given in previous issues of this report the statistics of the disease for recent years are not fairly comparable with those for early years. Several stations on the North-West Frontier such as Dera Ismail Khan, Edwardesabad and Chakdara were, as usual, among those with the highest admission rates for the year and the list also included stations like Delhi, Peshawar and Fatehgarh which are notoriously malarious. In some of these

* When a Table or Appendix is marked with an asterisk it refers to the Standard Tables or Appendices of the Sanitary Commissioner's Annual Report.

stations the admission rates were considerably higher than in 1909, but among Indian troops the extent to which soldiers suffering from malaria are treated as out-patients (in which case they are not shown in the returns) varies so much in different years that an increased admission rate does not always mean a greater prevalence of the disease. Among the regiments which suffered most severely from malaria during the year were the 40th Pathans and the 19th Punjabis at Dera Ismail Khan, the 125th Rifles at Bangalore, the 33rd Punjabis at Delhi, the 52nd Sikhs at Peshawar, the 47th Sikhs at Dera Ismail Khan and the 21st Punjabis at Bannu. The medical officer of the 40th Pathans found that in January 40 per cent of the men in the regiment had enlarged spleens and that although the rate fell to 20 per cent in June it rose again to 30 in October. The prevalence of the disease in the 125th Rifles has been the subject of several local enquiries, one result being the drainage of a large tank which was believed to be the chief source of malaria-carrying anopheles. The Sanitary Officer of the 9th Division now reports that this measure has failed, possibly because many much smaller breeding places still remain in the vicinity of the lines and beyond their boundary. In the year under review the admissions on account of malaria in the regiment were 11 in March, 20 in April, 105 in May and 217 in June. On the 5th July the regiment was moved into camp some miles from the barracks. The medical officer of the 33rd Punjabis reported that the splenic index among children in the lines of the regiment at Delhi was 55 per cent in December. Residence at Chakdara was held to be responsible for the prevalence of malaria in the 52nd Sikhs, but no details regarding the malarial conditions of that outpost are available. The measures adopted for the prevention of malaria in the Indian army are similar to those employed among European troops and in some stations Indian soldiers are beginning to buy and to use mosquito curtains.

Pyrexia of uncertain origin.

32. In 1910 there were recorded under the heading pyrexia of uncertain origin 3,742 admissions to hospital with 24 deaths. Among the cases at least five fairly distinct clinical types of disease could be distinguished, namely, (1) cases which in all probability were malaria, but in which no parasites were found in the blood; (2) cases of one-day fever said to be due to "chills," over fatigue or errors of diet; (3) cases of three-day fever which the clinical accounts show to have been phlebotomus fever; (4) cases of seven-day fever corresponding to the clinical type described by Rogers. Some of these may have been cases of dengue; (5) serious cases of long continued fever which sometimes terminated fatally, the diagnosis being obscure throughout the course of the illness. The regiments in which most cases returned as pyrexia of uncertain origin occurred during the year were the 1-3rd Gurkha Rifles at Chitral, in which nearly all the cases were of the second type mentioned above, the 127th Baluch Light Infantry at Poona, the 54th Sikhs at Chakdara and the 28th Punjabis at Lahore Cantonment in all of which most of the cases were of the third type, and the 9th Bhopal Infantry at Rangoon and the 27th Punjabis at Alipore in both of which fevers of the fourth type were common. Cases of the fifth type occurred in a number of regiments and an examination of the case-sheets in which the signs and symptoms of the 24 patients who died were recorded shows that many of them were recorded as pyrexia of uncertain origin only after every known diagnostic method had been applied with a negative result. In Indian regiments permission to perform a *post mortem* examination is almost never obtained, but similar cases of obscure long continued fever are frequently treated in the jails and civil hospitals of India and it is much to be hoped that their pathology will soon be worked out.

Sandfly fever.

33. An account of sandfly fever—a heading which appears for the first time in the statistics of the year under review—has already been given in the Section dealing with European Troops. Among Indian troops 508 cases with no death were recorded during the year, nearly all of them from five stations—Kila Drosh, Chitral, Nowshera, Attock, and Kohat—which are situated close together on the North-Western Frontier of the Empire. Many cases of the disease were returned under the heading pyrexia of uncertain origin and several good clinical accounts of it appeared under that heading in the annual reports.

Kala Azar. Relapsing fever. Typhus fever.

34. There were nine new admissions on account of kala azar during the year as compared with eleven in 1909 and including the patients who remained under treatment from that year there were ten deaths. The regiments in which cases occurred were the 1-2nd, the 2-2nd, the 2-6th and the 1-10th Gurkha Rifles, the 1st Brahmans and

the 94th Russell's Infantry. No noteworthy remarks about the cases appeared in the annual reports. Two cases of relapsing fever were recorded, one in the 122nd Infantry at Ahmedabad, the other in the 125th Rifles at Bangalore. Both were diagnosed by the microscope. One case of typhus fever occurred in the Queen's Own Corps of Guides at Mardan and another in the 82nd Punjabis at Nowshera. Neither case was fatal. It appears from the report of the Sanitary Officer of the 1st Division that in Peshawar there were several cases among followers but no case occurred among the troops.

Enteric fever.

35. The admissions and deaths recorded as due to enteric fever in the Indian army, as well as the deaths recorded as due to pyrexia of uncertain origin, have increased considerably since the heading remittent fever was removed from the annual returns. In 1910 the number of cases diagnosed as enteric fever was 329 and the number of deaths 58 as compared with 284 and 57 respectively in 1909. The cases occurred among 122 regiments located in 67 stations. There were 53 regiments in which only one case occurred, 33 in which two cases occurred, eleven in which three cases occurred, six in which four cases occurred, four in which five cases occurred and seven in which six cases occurred. Of the remaining regiments affected those with most cases were the 2-10th Gurkha Rifles at Almora in which there were 20, the 1-7th Gurkha Rifles at Quetta in which there were 14, the 1-6th Gurkha Rifles at Abbottabad in which there were 12, the 2-5th and the 1-9th Gurkha Rifles at Abbottabad, Dehra Dun, Chitral and Drosh in each of which there were eleven, the 2-6th Gurkha Rifles at Abbottabad and the 51st Sikhs at Peshawar and Bannu in each of which there were eight and the 56th Rifles at Sehore and Kohat in which there were seven. The great majority of the cases were diagnosed on clinical evidence assisted by the Widal test, but in the 1-7th Gurkha Rifles and one or two other regiments the cultivation of the bacillus from the peripheral blood was carried out with positive results. It does not appear from the reports of medical officers that the source of infection was definitely ascertained in any case; in most regiments the cases occurred at irregular intervals throughout the year and appeared to be entirely unconnected with one another. Several medical officers referred to polluted water or to infected dust as having been the most likely sources of infection. Endeavours were made in a few regiments to find "carriers" among men engaged in the cooking and handling of food, but without success.

Mediterranean fever.

36. There were 23 admissions to hospital on account of Mediterranean fever during the year as compared with thirteen in 1909. None of the cases was fatal. Five of the admissions were at Peshawar, three at Lahore Cantonment and at Jacobabad and two at Nowshera and at Dera Ismail Khan. The largest number of cases in any regiment was four in the 69th Punjabis at Peshawar and there were three in the 7th Lancers at Jacobabad and in the 28th Punjabis at Lahore Cantonment. Except that the medical officer of the 69th Punjabis stated that the diagnosis was confirmed bacteriologically no remarks were made as regards the disease in those regiments.

Plague.

37. The number of cases of plague among Indian troops rose from sixteen in 1909 to 31, and the number of deaths from eight to 22. The cases occurred in 19 different regiments located in 17 stations, the greatest number in any regiment being five with three deaths in the 116th Mahrattas at Bombay. In this regiment the two patients who recovered had been inoculated in the previous year while the three who died had not, and it was said that this so impressed the men of the regiment that when general inoculation was advised as a voluntary measure 616 fighting men, 93 women, 87 followers and 66 children were inoculated in less than a week. In the 51st Sikhs at Peshawar there were three cases of pneumonic plague, all fatal. The first patient contracted the disease in his native village while on leave. He died in hospital on June 5th, and on June 10th two men who had been in attendance on him fell ill with the disease and died within two days. The diagnosis was confirmed bacteriologically in one of the cases. Removal of affected regiments into camp, inoculation, rat destruction and disinfection of barracks are the preventive measures usually adopted.

Scurvy.

38. The total number of admissions to hospital on account of scurvy during 1910 was 100 which gives a ratio of ·8 per thousand as compared with a ratio of 1·4 per thousand in the previous year. Most cases occurred, as usual, in the regiment stationed at various outposts

near Quetta, but the medical officer did not remark upon the disease in his annual report.

Tubercle of the lungs.

39. The admission rate on account of tubercle of the lungs in the Indian army as a whole was 2·4 per thousand in 1910 as compared with 2·3 in 1909 but the death rate was only ·19 as compared with ·39. There was again a noteworthy reduction in the numbers of cases and deaths among Gurkhas who, as is well known, suffer more from the disease than any other class in the Indian army. The admissions and deaths among soldiers of this class were 57 and eight as compared with 63 and 21 in 1909. The statement in the margin is interesting as showing that the reduction during recent years has been shared by the whole army but that it has been much greater among Gurkhas than among the rest of the troops. This is also indicated by the fact that Gurkha regiments are no longer always at the head of the list of regiments with the largest numbers of cases. In the year under review the Corps of Guides at Mardan was in this position with 17 admissions, the 76th Punjabis at Tien-tsin in North China coming next with 15 admissions, and the 34th Sikh Pioneers at Sialkot and the 2-2nd Gurkha Rifles at Dehra Dun coming third with nine admissions in each. The medical officer of the Corps of Guides reported that nearly all the patients probably became infected at Fort Abazai where the accommodation is bad and the ventilation and lighting very insufficient. Isolation of cases and disinfection of the rooms in which the patients had lived were very thoroughly carried out. The prevalence of the disease in the 76th Punjabis at Tien-tsin has already been alluded to. In consequence of a succession of cases in the 34th Sikh Pioneers at Sialkot the regiment was placed under canvas and the barracks thoroughly disinfected, the walls being scraped and lime-washed and the floors dug up and relaid.

TUBERCLE OF THE LUNGS. RATIO PER 1,000.

Year.	Army of India.		Gurkhas.		Excluding Gurkhas.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1901 ...	4·2	·84	13·1	3·95	3·4	·57
1902 ...	4·3	·80	15·6	4·24	3·2	·47
1903 ...	3·9	·68	28·9	2·88	3·3	·44
1904 ...	3·9	·54	10·6	2·66	3·2	·28
1905 ...	3·1	·50	6·1	1·58	2·7	·37
1906 ...	2·5	·32	5·2	2·41	2·2	·29
1907 ...	2·5	·33	4·8	1·03	2·3	·24
1908 ...	3·0	·42	5·0	1·43	2·7	·28
1909 ...	2·3	·39	4·0	1·33	2·1	·26
1910 ...	2·4	·19	3·6	·50	2·3	·15

Pneumonia.

40. The admission rate on account of pneumonia was 9·4 per thousand and the death rate 1·34 as compared with rates of 11·8 and 1·88 per thousand respectively in 1909. The disease was less prevalent than in the previous year in six of the twelve geographical groups and the highest admission rates for the year were recorded in the Assam group (16·8 per thousand) and the North-West Frontier group (14·9). The months of greatest prevalence were, as usual, January, February, March, November and December. Stations on the North-West Frontier such as Dargai, Mardan and Fort Lockhart were among those at which the disease was most prevalent.

Dysentery and Diarrhœa.

41. Dysentery was less prevalent than in 1909 and the number of deaths was only twelve as compared with 19. The disease was most prevalent at Colombo, Santa Cruz, Manzai, Jutogh, Rangoon, Dera Ismail Khan and Chakdara, the admission rates in these stations ranging between 156 and 64 per thousand. As regards the prevalence of the disease in regiments most cases occurred in the 66th Punjabis at Belgaum and Barrackpore and in the 98th Infantry at Colombo. The medical officer of the 66th Punjabis attributed the prevalence of dysentery partly to the damp and unhealthy site on which the lines in Barrackpore are built.

There were in all 1,076 admissions to hospital and five deaths from diarrhœa, the death rate being the same as in 1909.

42. Although during recent years there has been a decrease in the recorded prevalence of venereal diseases among Indian troops, it is far from having been so marked as among European troops. During 1910 there were in all 2,212 admissions and four deaths recorded from these diseases in the Indian army, the corresponding figures for the European army being 4,272 and 1. On the respective strengths of the two armies the admission rates work out to 16·9 per thousand for the Indian army and 58·9 for the European. The rate for the Indian army was slightly higher than in 1909, the rise being most marked in the figures for Gurkhas in which class the rate rose from 21·0 to 22·5. Among the stations occupied by the Northern Army, Almora, Naini Tal, Kohima, Benares, Amritsar and Campbellpore were those at which the admission rates were highest and among stations occupied by the Southern Army the highest rates were recorded at Bombay, Dibrugarh, Ahmednagar, Poona and St. Thomas's Mount. Almora was also the station at which the largest number of cases were recorded during the year, namely 116, which on the average strength of 1,034 gives a rate of 112 per thousand.

Venereal diseases.

43. There were eighteen admissions to hospital on account of beri-beri as compared with three in 1909, the increase being due to an outbreak of thirteen cases in the 83rd Infantry at St. Thomas's Mount, Madras. The medical officer of the regiment reported that the cases were of the "dry" variety, the chief symptoms being motor paralysis, anæsthesia and slight œdema of the legs. He attributed the disease to the consumption of a particular kind of rice and stated that when this was changed the outbreak ceased. The remaining cases occurred in the 73rd Infantry at Cannanore, the 63rd Infantry at Bellary and the 79th Infantry at Aurangabad, but the medical officers of those regiments made no remarks about them in their annual reports.

Beri-beri.

44. During the ten years 1900 to 1909 there were altogether 111 cases of suicide in the Indian army, an average of about eleven per annum. In the year under review there were ten, of which three were by arsenic poisoning, three by gunshot, two by being run over by trains, one by hanging and one by opium poisoning.

Suicide.

SECTION III.

GENERAL POPULATION.

Meteorology, crops and general conditions.

45. The chief features of the rainfall of 1910 are described as follows in a memorandum furnished by the Meteorological Department of the Government of India:—(1) The precipitation during January and February was in general considerably below the average. (2) The hot weather period, March to May, was abnormally dry throughout the country except in Burma where more than the usual amount of rain fell in all the three months. (3) The monsoon current was, on the whole, more active than usual, and the rainfall of the period was above the normal and favourably distributed in almost all parts of the country. (4) During the last three months of the year the greater part of the country received more than the normal amount of rain. The most noteworthy feature was a cyclonic storm which gave late and heavy rain in the Central Provinces, Central India and the east of the United Provinces during the second week of November. (5) On the whole there was more rain than usual in 1910, the total precipitation on the plains surpassing the average by 2·8 inches or 6 per cent. The excess was not distributed over the whole year, for the first two seasons were markedly dry over by far the greater part of the country. The Bay Islands, Lower Burma, Chota Nagpur, Kashmir, Baluchistan, Central India East, the Konkan and Malabar were the only areas which failed to receive their normal annual rainfall, but the deficiency was small except in the Konkan where it amounted to 13·4 inches or 12 per cent.

The departures from normal of climatic elements other than rainfall were unimportant during the greater part of the year. The chief meteorological features of the year in separate provinces will be noted in the paragraphs which follow.

The favourable climatic conditions brought abundant crops to harvest during the year, the yield of wheat being 15·2 per cent. above the average and of rice 24·7 per cent. The surplus of Burma rice available for export amounted to nearly 44 million hundredweights of cleaned rice. The outturn of oilseeds and sugarcane was also considerably greater than in 1909 and at the end of the year the area under those crops and under wheat was unusually high and the condition of the crops good.

Although plague and cholera were more prevalent than in 1909 the year was, on the whole, one of good health and prosperity.

Births and deaths.

46. According to the census of 1901 the populations of the areas in which births and deaths were registered in the Indian Empire in 1910 aggregated 226,438,733 and the recorded birth and death rates are calculated on that total; but from the provisional figures of the census of 1911 which are now available it is seen that owing to the changes which have occurred in the numbers of the different populations since 1901 the rates are inaccurate and that they are much more so for some provinces than for others.

The births and deaths registered in the several provinces of British India during 1910 are given in the following table:—

Province.	Births.			Total deaths.			Ratio of deaths per 1,000 of population.			Mean death rate during previous five years.		
	Total number.	Ratio per 1,000 of population.	Mean ratio during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.
Bengal	2,007,222	39·72	37·59	90,423	1,582,217	1,672,640	27·99	38·45	38·10	34·20	36·32	36·19
Eastern Bengal and Assam ...	1,131,924	37·96	39·07	14,770	990,226	1,004,996	23·33	33·93	33·31	23·83	32·31	32·13
United Provinces	1,955,424	41·00	38·68	135,209	1,708,969	1,844,178	40·17	38·55	38·67	48·94	42·89	43·32
Punjab	859,432	42·7	41·1	67,597	601,642	669,239	34·42	33·16	33·28	47·83	45·40	45·64
North-West Frontier Province	72,785	38·1	36·3	4,728	46,513	51,241	25·71	26·97	26·85	31·91	32·34	32·13
Central Provinces	663,400	55·42	52·33	54,187	483,065	537,252	43·57	45·03	44·88	...	...	38·56
Madras	1,235,169	33·6	31·8	123,219	784,203	907,422	28·9	24·1	24·7	30·0	23·4	24·2
Coorg	4,638	25·68	25·40	790	6,032	6,822	51·80	36·48	37·77	41·85	29·73	30·75
Bombay	689,701	37·32	34·25	94,690	465,313	560,003	35·69	29·03	30·30	42·37	26·83	30·85
Lower Burma	197,240	35·46	33·73	26,813	123,286	150,109	38·01	25·39	26·99	41·33	24·88	25·92
Upper Burma	110,701	37·13	...	12,891	77,359	90,250	39·09	29·17	30·27	42·60	25·84	27·66
Ajmer-Merwara	20,355	42·68	35·54	5,991	17,891	23,882	46·22	51·52	50·08	52·17	31·91	37·41
British India	8,947,991	39·52	37·61	631,318	6,885,716	7,518,034	34·08	33·12	33·20	39·21	35·04	35·40

The rise in the birth rate from 36·65 per thousand in 1909 to 39·52 was contributed to by all the provinces except Eastern Bengal and Assam and Coorg, and as would be expected the rise was greatest in the United Provinces and the Punjab in which the birth rates in 1909 had been low on account of the disastrous epidemic of malaria during the autumn of 1908. The birth rates were higher than the death rates in all provinces except Ajmer-Merwara and Coorg. On a mean for the whole country 107 males were born to every hundred females; the proportions in the different provinces will be found in Table XIII.

The death rate of 33·20 per thousand was higher by 2·29 than the unusually low rate of 1909, the rise being common to all provinces except Eastern Bengal and Assam, Burma and Ajmer-Merwara. In India as a whole the highest death rate was recorded in November and the lowest in June. In nearly all the provinces males died at a higher rate than females, and calculating the mortality among infants on the number of children born during the year the mean death rate of male infants worked out to 217·21 per thousand and of female infants to 201·17 (Table XVI).

47. The deaths from the chief diseases in the several provinces and in British India as a whole are shown in the following table :—

Chief diseases.

Province.	Cholera.		Small-pox.		Plague.		Fever.		Dysentery and Diarrhœa.		Respiratory Diseases.		All other causes.	
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
Bengal	162,611	3·21	7,440	·14	46,584	·92	1,031,929	20·42	45,902	·90	15,447	·30	362,727	7·18
Eastern Bengal and Assam.	117,969	3·95	10,620	·35	46	·001	694,971	23·31	25,556	·85	4,645	·15	151,189	5·07
United Provinces ...	102,462	2·15	873	·02	158,074	3·31	1,291,006	27·07	18,000	·38	21,589	·45	252,174	5·29
Punjab	2,131	0·11	3,019	·15	135,483	6·74	343,925	17·10	10,040	·50	46,999	2·34	127,642	6·35
North-West Frontier Province.	1,605	0·84	830	·43	30	·02	37,268	19·53	443	·23	1,806	·95	9,259	4·85
Central Provinces ...	5,316	0·44	2,794	·23	28,961	2·42	256,402	21·43	53,276	4·45	41,655	3·48	148,758	12·43
Madras	32,594	·09	19,198	·5	4,807	·1	321,381	8·7	58,117	1·6	35,018	1·0	436,247	11·87
Coorg	56	·31	46	·25	9	·05	5,717	31·65	271	1·50	63	·35	660	3·65
Bombay	3,694	·20	4,600	·25	25,043	1·36	263,523	14·36	46,643	2·52	59,880	3·24	156,620	8·47
Lower Burma ...	1,834	1·33	1,741	·31	4,417	·79	53,499	9·62	6,767	1·22	4,645	·84	77,206	13·88
Upper Burma ...	177	·06	76	·03	3,324	1·11	26,515	8·89	2,220	·74	2,268	·76	55,670	18·67
Ajmer-Merwara ...	2	·004	78	·16	6,517	13·67	15,166	31·80	437	·92	293	·61	1,389	2·91
British India 1910 ...	430,451	1·90	51,315	·23	413,355	1·83	4,341,392	19·17	267,672	1·18	234,308	1·03	1,779,541	7·86
British India 1909 ...	239,231	1·05	101,152	·45	145,333	·64	4,487,492	19·82	216,954	·96	203,363	·90	1,604,517	7·09

On comparing the figures for the year under review with those for 1909 it will be seen that there was a decrease in number of deaths attributed to fever and to small-pox, but an increase in the number recorded under each of the other headings tabulated. The increase of cholera was confined to Bengal, Eastern Bengal and Assam, the United Provinces, the Punjab and the North-West Frontier Province and it was considerable in only the first three of these areas. Small-pox declined in all the chief provinces except Lower Burma and the North-West Frontier Province. The death rate from this disease in towns was ·39 per thousand as compared with ·21 in rural areas. Adding the 99,250 deaths attributed to plague in the Native States (Table XXVI) to the figures in the above table the deaths from this disease aggregated 512,605 as compared with only 178,808 in 1909. There was an increase in every province except Upper Burma; it was greatest in the Punjab, the United Provinces and Bengal. The extent of country at present affected by plague is shown on the map published with the Annual Sanitary Report. Investigations into the epidemiology and mode of spread of the disease are being carried on continuously under the direction of the Advisory Committee appointed in 1905 and at the present time the services of five officers of the Indian Medical Service are entirely devoted to this work. Except during some of the summer months, when cholera was very prevalent there was a reduction in the deaths attributed to fever in nearly every month, but the reduction was confined to the northern and north-eastern provinces. The arrangements that have recently been made for investigating and combating malaria in India are fully described in Nos. 1 to 3 of an official publication entitled *Paludism* issued by the Sanitary Commissioner with the Government of India. The statistics of deaths attributed to dysentery and

diarrhœa and to respiratory affections were, as usual, of very little value as an indication of the prevalence of those diseases.

The following remarks relate to separate provinces and cities.

Bengal.

48. In the province of Bengal the rainfall of the year as a whole was normal, but from March to May it was in defect and from October to December in considerable excess. As a result of damage by floods the total yield of rice was slightly less than in 1909, but in general the year was one of good crops and prosperity.

Calculated on the census population of 1901 the birth rate for 1910 was 39·72 per thousand as compared with 37·79 in the previous year and the death rate 33·10 per thousand as compared with 30·55. The increase in the death rate was due almost entirely to the greater prevalence of cholera and plague. The former disease caused 162,611 deaths as compared with only 56,711 in 1909 and was chiefly prevalent during July and August. No district was free from the disease and in 25 of the 33 districts it prevailed much more severely than in 1909. Over 73 per cent. of the total deaths were recorded in Bihar. The treatment of wells with permanganate of potash was carried out in affected places in Bihar, Orissa, parts of Chota Nagpur and a few other areas. The epidemic of plague began at the end of 1909 and increased in intensity until the end of March 1910. The mortality then remained at a low figure until November when over 2,000 deaths were reported, the number rising to 5,219 in December. During the whole year 46,584 deaths were recorded as compared with only 11,779 in 1909. Evacuation continues to be the most popular of the measures taken for combating the disease in this province and only 349 inoculations were performed. The destruction of rats was carried out in seven districts. The deaths recorded from small-pox numbered only 7,440 as compared with 38,609 in the previous year, the decline being general throughout the province. The mortality recorded under the heading "Fever" was lower than it has been for many years. Anti-malarial operations were carried out in nine towns and towards the end of the year the local government nominated a committee for the investigation of malaria in the province and appointed a special officer with a suitable staff for systematic enquiry into problems connected with the disease. The free distribution of quinine during the fever season was carried out by 23 Sub-Assistant Surgeons specially deputed for the purpose and the sale of pice doses of quinine at post offices and by other agencies amounted to 15,450 parcels each containing 100 ten-grain powders and 5,640 phials each containing 300 tablets of $3\frac{1}{3}$ grains.

City and Port of Calcutta.

49. In Calcutta city the total number of births registered during 1910 was 17,106 as compared with 19,423 in 1909. The figures give rates of 20·1 and 22·9 per thousand respectively on the census population of 1901. The death rate was 27·9 per thousand as compared with 34·1 in the previous year and was the lowest recorded for more than twenty years. There were 4,679 deaths of infants, giving a ratio, calculated on the total births registered, of 273 per thousand, but it is said that the registration of births is more defective than that of deaths. Epidemic diseases were much less prevalent than in 1909. The mortality from cholera was the lowest recorded during the past ten years, the deaths from plague numbered only 1,262 as compared with 2,117 in 1909 and the deaths from small-pox only 48 as compared with 3,784. The number of deaths attributed to tubercle of the lungs, namely 1,878, was approximately the same as in 1909, and dysentery and diarrhœa caused 1,807 deaths as compared with 1,780 in that year. The etiology of an outbreak of epidemic dropsy or beri-beri which caused a considerable number of deaths in 1909 and 1910 was investigated by Major Greig, I.M.S., and his report has been published as No. 45 of the Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India.

The population of the port of Calcutta is said to be 29,768 and the recorded death rate in 1910 was only 3·9 per thousand, but according to the Medical Officer of Health of Calcutta the majority of the people who get ill in the port return to their homes in the city and most of the deaths occur there. The death rate among European seamen was 8·53 per thousand as compared with 7·96 in 1909 and among the native floating population the death rate was 4·63 as compared with 6·48.

50. In Eastern Bengal and Assam the rainfall was markedly deficient during the first five months of the year, but in considerable excess during the monsoon period and again from October to December, so that for the year as a whole the province received somewhat more rain than usual. Crops were good and abundant and there was no scarcity.

Eastern Bengal and Assam.

The recorded birth rate fell from 40·46 per thousand in 1909 to 37·96 and the decline was common to both towns and rural areas. The death rate of 33·71 per thousand was fractionally lower than in 1909, but higher by 1·58 than the mean rate for the quinquennium. On the tea gardens the birth-rate was 29·39 per thousand as compared with 25·8 in 1909 and the death rate rose from 28·4 to 29·01. The rural death rate was 33·93 per thousand compared with 23·23 in towns.

The number of deaths attributed to cholera increased from 71,737 in 1909 to 117,969 which is equal to a ratio of 3·95 per thousand of the census population of 1901. The curve of monthly deaths showed, as in the previous year, a double rise, the first during March to May, the second during October to December. The deaths of only 10,620 persons were attributed to small-pox as compared with 23,604 in 1909, but comparatively high rates were recorded in the districts of Nowgong, Bogra and Mymensingh. It is said that in the Nowgong district vaccination has for many years been carried on with difficulty as the Mahaparushiyas object to the practice on the ground that it is forbidden by their religion. The Ferazai Mohammedans are another class who object to vaccination, and in the town of Nawabganj inhabited by them the death rate from small-pox during the year was 21·17 per thousand. Other interesting statistics in connection with small-pox and vaccination are given in the report of the provincial Sanitary Commissioner. In all 46 deaths from plague were reported during the year, 45 of them occurring in the Noakhali district. As is usual in this province the outbreak was of the pneumonic type and nearly every case was fatal. There were 694,971 deaths from fever, the death rate falling from 24·56 in 1909 to 23·31. The local Government have recently made very thorough arrangements for the investigation of malaria in the province and the measures for mitigating the disease include widespread efforts to popularize the use of quinine and to make the drug available in an effective and cheap form.

51. In the United Provinces the first five months of the year were unusually dry, but the monsoon rainfall was normal and favourably distributed. In October rain fell heavily in the north-west of the provinces and in the second week of November a cyclonic storm gave unusually severe rainfall to the eastern areas, so that the total precipitation during the last three months of the year was much in excess of the normal. In the middle of July there was some anxiety about the condition of the crops, but it was quickly dispelled by good rainfall a week or two later, and for the year as a whole the yield of wheat, oilseeds and sugarcane was unusually abundant. The prices of food grains fell rapidly towards the end of the year.

United Provinces.

In 1909 there was a great fall to 33·32 per thousand in the birth rate in these provinces as a result of the malaria epidemic and scarcity of 1908, and the recovery from the effects of that year in 1909 is indicated in the rise of the birth rate to 41·00 per thousand in 1910. The rate is higher by 2·32 than the mean rate for the previous five years. The rise was accompanied by an increase in the death rate from 37·34 per thousand in 1909 to 38·67.

There was a great increase in the mortality from cholera and plague but a decrease from small-pox and fever. The death rate from cholera was 2·15 per thousand as compared with only ·46 in 1909. The disease was widely distributed almost throughout the year and prevailed in epidemic form from May to October, being most severe in July when 31,255 deaths from it were reported. The deaths from plague numbered 158,074 as compared with 38,394 in the previous year. The prevalence of the disease increased to a maximum in March, declined rapidly during the summer and increased again in the autumn and winter. In all 74,414 persons were inoculated during the year. Only 873 deaths from small-pox were recorded, the mortality under this heading being lower than in any of the last forty years. Malaria was only very slightly prevalent during the year and the deaths recorded as due to fever were less by 184,564 than in 1909. A provincial and eight divisional committees have been formed for dealing with malaria in these provinces and enquiries by a special officer and staff of assistants are

being prosecuted continuously. Various new measures for popularizing the use of quinine were introduced during the year.

Punjab.

52. Climatic conditions in the Punjab were abnormal in that the period from January to May was unusually dry and the remainder of the year unusually wet. The monsoon rainfall was more than 20 per cent. above the average and in the early days of October unseasonably heavy rain fell over the south-east of the province. The rainfall of the year as a whole was 11 per cent. in excess of the normal in the east and north of the province and 5 per cent. in excess in the south-west. Crops were abundant, the prices of food stuffs fell greatly and except for the continued prevalence of plague the public health was good.

The provisional figures of the census of 1911 show that the population in this province has decreased since 1901 and that in some districts the decrease has been very great. For this reason the recorded birth and death rates for 1910, which are calculated on the census figures of 1901, are lower than the correct rates and deductions of much value cannot be based upon them. Following the recovery of the people from the malaria epidemic and scarcity of 1908 there was a rise in the birth rate from 35·1 per thousand in 1909 to 42·7 in 1910, but owing chiefly to the more severe prevalence of plague the rise was accompanied by an increase in the death rate from 30·89 to 33·28. Although the birth rate is calculated on the basis of a greater population than is present it was higher than in any other province except the Central Provinces.

Cholera caused 2,131 deaths as compared with 1,513 in 1909. The disease was present from March until November, the months of greatest prevalence being August and September. There was a slight decrease in the deaths from small-pox and a great decrease in the deaths from fever, but the mortality from plague increased from 35,655 in 1909 to 135,483. The disease was most prevalent in the Delhi Division and in the central districts of Ludhiana, Ferozepore, Lahore, Amritsar and Gurdaspur. The portion of the province north of the Jhelum river was remarkably free from the disease. It is said that among the people the former attitude of hostility and suspicion in regard to anti-plague measures has disappeared and that they are now ready to seek and to accept advice. Inoculation, evacuation and rat destruction are the principal measures upon which reliance is placed and the large staff of itinerant plague medical officers have done excellent work not only in dealing with plague but in providing medical relief generally and in helping to combat epidemics of malaria and cholera. The total number of anti-plague inoculations performed during the year was 104,713. A special medical officer is in charge of the measures against plague and another has recently been appointed for the investigation of malaria. A complete report on epidemic malaria in the province by Major S. R. Christophers, I. M. S., has recently been published as No. 46 of the Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India.

North-West Frontier Province.

53. In the North-West Frontier Province the rainfall in 1910 was considerably in excess of the normal especially during January and February and again during the monsoon period. Crops were abundant and there was a fall in the price of food grains throughout the province.

The birth rate rose from 34·7 per thousand in 1909 to 38·1, which is higher by 1·8 than the quinquennial mean, and the death rate was 26·85 per thousand as compared with 26·57 in the previous year and a mean quinquennial rate of 32·13. The proportions of male to female births and of deaths of male to deaths of female infants were very high, this being ascribed to greater neglect to register vital occurrences relating to females.

There were 1,605 deaths reported as due to cholera during the year as compared with only 134 in 1909. The first death was reported in May and the mortality increased each month until September. All the five districts were affected. From small-pox 830 deaths were recorded, the death rate being ·43 per thousand as compared with 32 in the previous year. The rate was higher than in any other province except Madras. The deaths of 37,268 persons were registered as due to fever, the number being less by 2,135 than in 1909. About 120 pounds of quinine were distributed gratuitously in malarious areas.

54. In the Central Provinces and Berar the first five months of 1910 were unusually dry, but during the remainder of the year the rainfall was considerably in excess of the normal especially in Berar which received during the monsoon period 8½ inches more rain than usual and during the remainder of the year two inches. On the whole good harvests were reaped and the prices of food were favourable.

Central Provinces.

Heavy rainfall, high birth and death rates and an unusually severe prevalence of epidemic diseases were noteworthy features of the year. The birth rate rose from 51·63 per thousand in 1909 to 55·42 which is higher by 3·09 than the quinquennial mean and much the highest rate in any province during the year. The death rate rose from 33·09 to 44·88, the excessive prevalence of fevers and plague and a high infant mortality contributing chiefly to this result.

Cholera and small-pox caused less mortality than in 1909, but all the other chief diseases were much more prevalent than in that year. Plague caused 28,961 deaths and was especially severe in all the districts of Berar and in those of the Nerbudda and Wainganga Divisions of the Central Provinces. Evacuation is said to be the most popular of the measures taken against the disease, but rat destruction is also extensively practised and 32,798 anti-plague inoculations were done during the year. The deaths recorded as due to fever numbered 256,492 or 21·43 per thousand of the population as compared with 180,544 or 15·08 in 1909. The investigation of malaria is being undertaken by a special committee and a separate medical officer with a staff of assistants. A revised system of making quinine widely available in an effective form has been started. The mortality recorded under the heading dysentery and diarrhœa was greater by nearly 20,000 than in 1909 and the recorded death rate from respiratory diseases was 3·48 per thousand as compared with 2·60 in that year.

55. In the Madras Presidency the rainfall in 1910 was abundant and on the whole well distributed and the prices of food grains, which had been high in the two previous years, fell considerably.

Madras.

The population of the Presidency according to the census of 1901 was 38,232,930 exclusive of Europeans and Eurasians, and the population among whom births and deaths were registered in 1910 was according to the same census 36,742,903. The excluded population comprised the hill tribes of the Ganjam and Vizagapatam districts, the islanders off the coast of Malabar and the inhabitants of the Banganapalle State in Kurnool. The recorded birth rate rose from 33·1 per thousand in 1909 to 33·6 which is the highest rate on record. Owing chiefly to a greater prevalence of fevers the death rate rose from 21·8 per thousand to 24·7 which is fractionally higher than the quinquennial mean. The mean percentage of male to female births was 104·7 and calculated on the numbers born during the year, the death rate of male infants was 199·6 per thousand and of female infants 180·8.

The number of deaths from cholera fell from 39,424 to 32,594, the death rate being ·9 per thousand as compared with 1·1 in the previous year. December, January and February were the months of greatest prevalence. Small-pox accounted for 19,198 deaths as compared with 18,862 in 1909 and plague for 4,867 as compared with 3,844. The latter disease was chiefly prevalent in November and December and during those months deaths from it were recorded in 13 of the 24 districts in the Presidency. Segregation of patients and contacts, disinfection of houses, and surveillance during seven days of persons arriving from infected places were employed in addition to evacuation, rat destruction and inoculation. The death rate recorded from fever was 8·7 per thousand as compared with 7·3 in 1909, the increase being shared by twenty districts. Anti-malarial measures were carried out in some of the towns and two travelling dispensaries were started in the Chodavaram Agency as an experimental measure. In comparison with the previous year there was an increase in the mortality recorded under the headings dysentery and diarrhœa and respiratory diseases.

56. According to the Administration Report of the Corporation of Madras the number of births registered in the city during the year was 19,340 equal to a death rate of 37·9 against 37·2 in 1909. The death rate rose from 37·9 in the previous year to 39·8 in 1910, the mean ratio for the past five years being 45·5. Infantile mortality was 294·1 per 1,000

City of Madras.

of births compared with 29·0 in the previous year. Calculated on the census population of infants the ratio was as high as 416·6. The increase in the ratio of deaths was chiefly due to high mortality under "cholera" and "tubercle." It, however, occurred under all the principal heads excepting malaria, dysentery and diarrhœa and diseases of the respiratory organs. The city was practically free from plague, only seven imported cases having been reported, of which five proved fatal.

In the Port 229 outgoing vessels were inspected during the year and granted bills of health. Besides these there were 119 in-coming vessels from plague infected ports. The bedding and effects of the deck passengers and native crews on all these ships were disinfected.

Bombay.

57. Climatic conditions and the prices of food grains in the Bombay Presidency were normal during 1910 and the health of the people generally was good.

The birth rate (37·32 per thousand) was considerably higher than the rate recorded in 1909 and higher by 3·07 than the quinquennial mean. The death rate was 30·30 per thousand as compared with 27·38 in the previous year. Cholera caused only 3,694 deaths as compared with 28,714 in 1909 and small-pox caused 4,600 as compared with 5,019, but fevers, plague, dysentery and diarrhœa and respiratory diseases were more prevalent than in that year. The death rate from fevers rose from 12·11 per thousand in 1909 to 14·26. During the fever season 27 Sub-Assistant Surgeons were deputed to tour in selected districts for the purpose of enquiring into the prevalence of malaria and of treating persons suffering from this and other diseases. The deaths from plague numbered 25,043 as compared with 24,319 in the previous year, but both figures are small in comparison with the mortality recorded prior to 1908. During the year 30,635 persons were inoculated. The recorded death rate from dysentery and diarrhœa was 2·52 per thousand as compared with 1·90 in 1909 and from respiratory diseases it was 3·24 as compared with 2·89.

City and Port of Bombay.

58. In Bombay City the number of births registered during the year was 19,939, the birth rate being 20·39 per thousand as compared with 20·28 in 1909. The death rate rose from 35·66 per thousand in 1909 to 35·72 which, excepting the rate in that year, is the lowest since the appearance of plague. Cholera, plague and tubercle of the lungs caused fewer deaths than in 1909, but there was a higher mortality from small-pox, measles, fevers, dysentery and diarrhœa and diseases of the respiratory system. The deaths of infants numbered 8,253 as compared with 8,030 in 1909. Calculated on the number of births the rate of infant mortality was 414 per thousand. A complete investigation into the causes of malaria in the city and the measures necessary for its control has recently been made by Dr. C. A. Bentley and his report has been published by the local Government.

In the Port of Bombay 1,012 vessels of all kinds, with 176,925 crew and passengers were inspected during the year as compared with 954 vessels carrying 177,870 crew and passengers in 1909. The number of vessels disinfected was 56, of which 33 were vessels on which cases of infectious disease had occurred and 23 were pilgrim ships which had to be thoroughly cleansed and freed from rats and cockroaches by means of sulphur dioxide gas generated in a Clayton apparatus. The vaccination of a large number of pilgrims and of passengers and crew of ships on which cases of small-pox had occurred was carried out.

Burma.

59. The total rainfall during 1910 was deficient in Lower Burma and in excess in Upper Burma, but the percentage departures from the normal were not sufficiently great to have a marked effect upon the public health, and owing chiefly to the comparative absence of cholera the mortality was lower than in 1909.

In Lower Burma the birth rate was 35·46 per thousand as compared with 35·27 in 1909 and in Upper Burma it was 37·13 as compared with 37·10. The death rate in Lower Burma fell from 27·70 to 26·99 and in Upper Burma from 34·81 to 30·27. The birth rate was in excess of the death rate in 27 of the 30 districts.

In Lower Burma only 1,834 deaths from cholera and in Upper Burma only 177 were recorded as compared with 4,041 and 7,348, respectively, in 1909. Small-pox caused 1,817 deaths, of which only 76 occurred in Upper Burma. The mortality

from plague increased in Lower Burma from 3,365 in 1909 to 4,417, but in Upper Burma it fell from 3,581 to 3,324. All except eight of the districts were affected. In a number of towns a vigorous campaign against rats was carried out. The recorded death rate from fevers rose in Lower Burma from 9·44 in 1909 to 9·62, but fell in Upper Burma from 9·47 to 8·89.

Coorg and Ajmer-Merwara.

60. The births in the small province of Coorg numbered 4,638 and the deaths 6,822. Cholera caused 56 deaths, plague nine, small pox 46 and all except 994 of the remainder were recorded as due to fever. In Ajmer-Merwara the recorded birth rate was 42·68 per thousand as compared with 37·78 in 1909 and the recorded death rate 50·08 as compared with 50·94. Only two deaths were reported as being due to cholera and only 78 as being due to small-pox, but plague caused 6,517 as compared with 5,176 in the previous year and 15,166 deaths were attributed to fever.

Red Sea Pilgrim Traffic.

61. Between the 29th of August and the 29th of November 1909 twenty-five ships carrying in all 21,056 Muhammadans making a pilgrimage to Mecca *vid* Jeddah sailed from the Port of Bombay. Before the pilgrims embarked the ships were thoroughly cleansed and freed from rats by the Clayton process under the personal direction of the Port Health Officer, and the pilgrims themselves were medically inspected and their bedding and clothing were disinfected. All the ships were inspected at Aden or Perim on their way to Camaran, where, as usual, the pilgrims were landed to undergo seven days' quarantine according to the Turkish rules before proceeding to Jeddah. On one ship a case of small-pox occurred between Bombay and Aden and the passengers were landed at Perim in order that the ship might be disinfected. The patient was left in hospital at that place and the remaining pilgrims were re-embarked for Camaran. No case of cholera or plague occurred between Bombay and Jeddah, but from other diseases there were, according to the report of the Vice-Consul at Camaran, 87 deaths during the voyage to Camaran and 121 during the quarantine period there.

The Haj report states that the pilgrim season was prolonged on account of exceptionally heavy rains in the Hedjaz and that the City of Mecca, the town of Jeddah and several places along the route were flooded. Partly for this reason and partly on account of a combine among the shipping companies which resulted in the return fares being kept at very high rates, the pilgrims had to contend with even greater hardships than usual and the mortality among them was very great. Plague, fevers, dysentery, diarrhœa and respiratory diseases were severe and it was said that of the pilgrims from India about 20 per cent. died in the Hedjaz and that in Jeddah alone about 1,000 died. The Acting Vice-Consul described in detail the disgraceful condition of the municipal hospital at Jeddah and the Consul noted that the need for a proper hospital has been fully represented to Constantinople.

The pilgrims returned to India in 21 ships between the 20th of January and the 2nd of May 1910, and according to the Health Officer of the Port of Bombay they numbered only 16,900 in all. During the homeward voyage there were 363 deaths, the chief causes being old age, general debility, small-pox, dysentery, diarrhœa and privation. Small-pox occurred on fourteen of the ships and these were thoroughly fumigated by the Clayton apparatus and the clothing and bedding of 13,141 passengers and crew among whom small-pox had occurred were disinfected before the pilgrims were handed over to the Protector of Pilgrims for despatch to their homes.

SECTION IV.

JAILS OF INDIA.

62. The annual fluctuations in the number of prisoners in India are governed to a considerable extent by circumstances of prosperity and the reverse among the general population, and the annual fluctuations in the health statistics of the jails are dependent to a great extent upon differences in the physical condition of the prisoners at the time of their conviction. Chiefly for these reasons the general circumstances and health of the Indian people are mirrored in the jail statistics, but the reflection is far from being complete because in the first place the prisoners are not a good sample of the general population (they are drawn chiefly from the poorest and lowest classes and there are no very young people among them), in the second they are protected almost entirely from the effects of epidemic disease, and in the third they are saved from many adverse conditions of climate, food-supply and housing which, especially in unfavourable years, tend towards disease and death among the infirm, the very young and the very old of the free population. In our Indian jails the arrangements for counteracting the influence of adverse climatic and other conditions and for preventing the spread of communicable diseases are being more extensively and thoroughly applied every year, and the result is that while the death rates among the general population are rising, those among the prisoners are falling, and that while the rates among both classes of people fluctuate from year to year, the fluctuations in the jail death rates are becoming less frequent and less marked. This is highly creditable to those concerned with the administration and management of the prisons.

India.

63. The mean daily average number of prisoners of all classes in India, Burma, and the Andamans during 1910 was 110,455, or 1,794 fewer than in 1909. In five of the administrations there was a decrease in the mean daily strength as compared with the previous year, the decrease being greatest in Bengal and the Andamans, and in the remaining five there was an increase, this being greatest in Burma. The rates of sickness and mortality from all the chief diseases were lower than in the previous year and the mean death rate from all causes fell from 25·02 per thousand to 21·62. The decreased mortality was shared by all administrations except Eastern Bengal and Assam, the Punjab, the North-West Frontier Province and the Central Provinces.

The prison population in 1910. Total sickness and mortality rates.

In India and Burma the mean daily population fell from 99,104 in 1909 to 98,032 and the ratios of admission to hospital and of constantly sick fell from 618 and 28 to 549 and 25 per thousand respectively. The death rate fell from 22·85 in 1909 to 19·29, the rates in the several provinces ranging from 35·52 in the Central Provinces to 11·98 in Burma.

The conditions of life of the convicts in the Andamans differ widely from those of other Indian prisoners and for this reason their statistics will be excluded from the statistics of sickness and mortality now to be discussed.

64. Among prisoners of all classes in India and Burma the chief causes of sickness were malaria (admission rate 135 per thousand), abscess, ulcer and boils (61 per thousand), dysentery (58), diarrhœa (37), and respiratory diseases (27); while the principal causes of death were dysentery (death rate 3·46 per thousand), tubercle of the lungs (3·41) and pneumonia (2·57). Except respiratory diseases all the causes of sickness and death mentioned were less prevalent and less fatal than in 1909.

Causes of sickness and mortality.

65. Although the rainfall in the year 1910 was heavier than usual, especially during the last six months, the statistics of malaria among the prison population were exceptionally favourable. The total number of admissions into hospital was less by 3,873 than in 1909 and the admission rate was by far the lowest on record. The number of deaths also declined remarkably, the death rate being only ·90 as compared with 1·19. The decrease in sickness from this cause was shared by all the provinces except Madras, Bengal and Burma, and the decrease in mortality by all except Bombay. The frequency of attacks varied considerably in the different provinces: as usual the admission rate in the North-West Frontier Province (353 per thousand) was by far the highest

Malaria.

and in Burma (45 per thousand) lowest; between these extremes came Bengal and Eastern Bengal and Assam with rates of 282 and 174 per thousand respectively, the United Provinces, the Punjab and the Central Provinces with a range from 123 to 105 and Bombay and Madras with rates of 96 and 94. The following table shows that in comparison with former years nearly all these rates are very low.

Admission rates from malaria per thousand of average daily strength.

Province.	1894—1898.	1899—1903.	1904—1908.	1909.	1910.
Burma	159·5	131·6	45·2	35·5	45·4
Eastern Bengal and Assam ...	394·3	313·7	265·8	247·9	173·9
Bengal	290·2	322·1	304·3	273·8	281·8
United Provinces	296·3	260·7	226·3	212·1	123·2
Punjab	680·5	560·5	255·4	139·3	116·0
North-West Frontier Province ...	819·3	437·1	532·1	504·4	353·1
Bombay	311·7	241·7	150·2	123·8	96·3
Central Provinces	273·9	329·5	193·5	151·3	104·8
Madras	150·4	100·3	73·2	85·0	94·2
India excluding the Andamans ...	298·5	238·4	199·5	172·4	134·7

The figures of malaria among Indian prisoners, like those among troops, are, of course, affected by causes (such as more accurate diagnosis and the treatment of patients without admission to hospital) which tend to bring about a statistical reduction without effecting a real decline of prevalence, but in the jails the influence of these causes is not great, and there is no doubt that the decline of malaria shown in the above table is a real one due to the measures which for a good many years have been carried out with increasing thoroughness in the majority of Indian jails. Among these measures quinine prophylaxis is the one to which most attention is necessarily directed and the one to which the reduction is attributed by the great majority of medical superintendents. During 1910 several Inspectors-General of Prisons aided the Committee for the Study of Malaria in India by instituting investigations into the action and use of quinine in the jails of their provinces. Some valuable results of these enquiries have been received, but it has been decided to delay their publication until the number is sufficient to justify a moderately complete analysis.

Dysentery.

66. In most provinces the prevalence of, and mortality from, dysentery was much less than usual, and for India and Burma as a whole the admission rate was only 57·7 per thousand and the death rate 3·46 as compared with 70·2 and 4·20 in 1909. In the Punjab, the Central Provinces, Bombay and Eastern Bengal and Assam, however, the admission rates were higher than in that year and in the Punjab and the Central Provinces the death rates were higher. By far the highest admission rate was recorded, as usual, in Eastern Bengal and Assam (202 per thousand), the next highest being only 99 per thousand in Bengal. As regards death rates the Central Provinces stand alone with the exceptionally high rate of 16·26 per thousand, Eastern Bengal and Assam coming next with a rate of 7·93 and then Madras and the Punjab with rates of 3·88 and 3·87. Further details of the relative incidence of the disease are given in the paragraphs on the several administrations. In the jails of India as a whole July to September are usually the months of greatest prevalence; in 1910 most cases occurred during August. The first stage of an enquiry into the causation of dysentery in India, which was begun in December 1908 by the staff of the Central Research Institute, has now terminated and a preliminary report entitled "Dysentery and Liver abscess in Bombay" by Major E. D. W. Greig and Captain R. T. Wells has been published as No. 47 of the Scientific Memoirs.

Tubercle of the Lungs.

67. Favourable or unfavourable conditions among the general population are usually reflected in the statistics of tubercle of the lungs among prisoners, and this was the case in 1910, for in India as a whole the year was one of good health and prosperity and the admission and death rates from tubercle of the lungs among prisoners fell from 9·9 and 3·72 per thousand respectively in 1909 to 8·7 and 3·41. The fall in the rates was shared by all the provinces except Eastern Bengal and Assam, the Punjab and the Central Provinces. In Eastern Bengal and Assam and in the Punjab overcrowding existed to such an extent as to render an increase in the amount of this disease inevitable; in the Central Provinces the admission of two batches of very unhealthy prisoners from the Bastar State raised the death rates all round, for in these provinces owing to the low average strength a slight increase in the total number of deaths makes a considerable difference in the rate. For India and Burma as a whole the statistics of the last ten years do not indicate any important change in the prevalence and mortality of tubercle of the lungs among prisoners; in the different provinces considered separately the increase during recent years in the Punjab jails and the decrease in the jails of Bombay and Burma are the most noteworthy features of the statistics. In all provinces strenuous efforts to ensure the segregation of all tuberculous prisoners are made, but they are frequently defeated by lack of accommodation and by the almost general absence of separate jails or wards for this purpose. Whether or not we believe that most of the cases of tubercle of the lungs are contracted outside or inside the jails* nothing is clearer than the close correlation between overcrowding and the mortality from the disease; and there can exist no reasonable doubt that if the lack of accommodation, which is a chronic defect of the jails in several provinces, could be remedied, a great change in the death rates from tubercle of the lungs and other communicable diseases would result.

Pneumonia.

68. In all the provinces except Burma the admission rates from pneumonia were lower than in 1909 and in all except Burma and the Central Provinces the death rates were lower, so that the mean admission rate for India fell from 14·3 per thousand to 11·0 and the mean death rate from 3·60 to 2·57. In Burma the admission and death rates rose from 2·2 and ·66 respectively to 2·9 and ·81, and in the Central Provinces, with a fall in the admission rate from 6·3 to 5·5, the death rate rose from ·93 to 1·75. The admission and death rates in the several provinces ranged from 22·2 and 4·38 per thousand respectively in the Punjab to 2·9 and ·81 in Burma. December was, as usual, the month of greatest prevalence.

Cholera, small-pox, plague, enteric fever, kala azar.

69. Cholera caused only 42 cases with 23 deaths as compared with 201 cases and 111 deaths in 1909. The jails in the Punjab, the North-West Frontier Province and Bombay were entirely free from the disease and in Madras there was only one non-fatal case. Small-pox was also much less frequent, the number of cases being only 27 as compared with 50 in the previous year. Three deaths occurred from this disease. Plague caused only three cases, one in Bombay, one in the Central Provinces and one in Burma. All the cases were fatal. There were in all 87 admissions to hospital recorded as due to enteric fever during the year and 23 of the cases were fatal. The admission and death rates were practically the same as in 1909. Cases were recorded from every province, but the numbers were greatest in Madras and Burma which were also the provinces in which cases recorded under the heading pyrexia of uncertain origin were by far the most numerous. Only one admission from kala azar was recorded during the year. The prisoner died in the Hooghly jail after an illness lasting about five months. The diagnosis was made on clinical evidence.

Bengal.

70. The favourable circumstances of the civil population in Bengal resulted in a great decrease of crime and the daily average strength of the jail population fell from 16,036 in

* On this question the available statistics for 1910 are as follows: (1) Of the 807 prisoners in whom the disease was diagnosed 323 were admitted to hospital within six months of their admission to jail. (2) Of the 324 deaths from tubercle 64 occurred during the first six months' imprisonment and 128 in the following eighteen months. (3) In central jails the admission ratio was highest among prisoners who had been in prison between two and three years, but the death ratios rose almost continuously from 1·30 per thousand among prisoners who had been less than six months in prison to 9·50 among those who had been between three and seven years. (4) Of the 210 prisoners who died from tubercle of the lungs in central jails 102 were in good health on admission to jail, 70 in indifferent health and 38 in bad health; and of the 114 who died from the disease in district jails, 33 were in good health on admission to jail, 41 in indifferent health and 40 in bad health.

1909 to 13,947. Overcrowding, which had been serious in the two preceding years, was almost absent and the general health of the prisoners was unusually good.

The rate of admission to hospital was 876 per thousand as compared with 916 in 1909, the constantly sick rate was 36 as compared with 40 and the death rate was 18·36 as compared with 25·13. From all causes there were only 256 deaths against 403 in the previous year, and except a rate of 16·94 in 1907 the death rate for the year under review is the lowest on record in this province. All the chief diseases except cholera (from which there were eight admissions against three in 1909) shared in the decrease of sickness and mortality, a noteworthy feature of the year being the marked decline of dysentery. From this disease the admission and death rates were 99·2 and 3·59 per thousand respectively as compared with 151·5 and 6·42 in 1909. In twenty of the 39 jails in the province no death was recorded under this heading and Hazaribagh was the only jail in which more than four deaths from it occurred. Captain Wells, I.M.S., was deputed from the Central Research Institute to study the etiology of dysentery in this jail during the year. Tubercle of the lungs declined in prevalence and caused only 46 deaths against 63 in the previous year. The Inspector-General draws attention to the observation that in the Bengal jails tubercle increases or decreases according to the extent to which overcrowding exists. He considers that while only a few cases of the disease can be definitely traced to infection contracted in the jails there is no doubt that in years when the barracks and worksheds are overcrowded the conditions are such as to cause a renewed activity of many latent infections. He records with regret that the opportunity of obtaining the jail at Berhampore for the segregation of tuberculous prisoners has disappeared and notes that the disease cannot be effectively controlled until a separate jail for infective cases is provided. The admission rate from malaria was about the same as in 1909, but the death rate fell from 2·06 to 1·43 per thousand of the average daily strength. In view of the constant arrival of new prisoners infected with malaria it is difficult to bring about a great reduction in the rate of admission to hospital, but in 1910 among more than 89,000 prisoners who passed through the jails there were only 3,930 admissions and twenty deaths ascribed to the disease. All new-comers are placed under quinine treatment and the prophylactic issue of the drug is enforced in all jails. It is said that the tablets of quinine which are now prepared in large quantities in the Alipore Prison for juveniles are generally appreciated. The admission and death rates from pneumonia were 8·4 and 2·22 per thousand, respectively, as compared with 10·0 and 2·68 in 1909.

Eastern Bengal and Assam.

71. The jail population in Eastern Bengal and Assam has increased steadily since 1905 and overcrowding has become a serious defect. In the year under review with an increase in the daily average strength from 7,173 to 7,436 five jails were considerably overcrowded throughout the year, one jail for ten months, one for five months, two for four months, three for three months, and two for two months. The Inspector-General remarked upon the serious effect which the excessive overcrowding had upon the health of the prisoners and earnestly hoped that the construction of the central jail at Comilla would be taken in hand immediately and the work completed expeditiously.

The health statistics of the prisoners were not favourable, for although, chiefly as a result of a decline in malaria, the admission rate for the year was lower than in 1909, the constantly sick rate rose from 37 per thousand to 39 and the death rate from 29·97 to 34·16 which is higher than in any of the previous ten years. Dysentery, tubercle of the lungs and pneumonia were the chief causes of the excessive mortality. The death rates from tubercle of the lungs and pneumonia were higher than in any other province except the Punjab and the death rate from dysentery was higher than in any except the Central Provinces. Tubercle of the lungs caused 97 admissions to hospital and 48 deaths as compared with 60 and 26 in the previous year, Dacca being the jail in which most cases and deaths occurred. The Inspector-General considered that the overcrowded state of the jails and lack of separate accommodation for the complete segregation of tuberculous prisoners were largely responsible for the spread of the disease. Dysentery caused 59 deaths and pneumonia 30, Mymensingh, Barisal and Faridpur, all of which were greatly overcrowded, being the jails in which both these diseases were most prevalent. The decline of malaria was attributed mainly to the systematic use of quinine as a prophylactic aided by other antimalarial measures. The prophylactic issue was enforced

in all jails from July to the end of November, the dose being ten grains twice weekly. Cholera caused nine cases with six deaths as compared with sixteen and eleven deaths in the previous year.

United Provinces.

72. Among the general population of the United Provinces the year was one of recovery from the effects of famine and epidemic malaria which had been so disastrous during 1908 and part of 1909; and in comparison with those years there was a marked decrease in the number of prisoners admitted to jail and a great improvement in their general health and condition.

The daily average number of prisoners fell from 26,070 in 1909 to 25,562, and there was no overcrowding in any of the jails. The rate of admission to hospital fell from 574 to 462 per thousand, the constantly sick rate from 28 to 23 and the death rate from 23·79 to only 15·65. A noteworthy feature of the statistics is the low death rates in jails such as Gorakhpur and Saharanpur which are usually notorious for a high mortality, especially from dysentery. Cholera appeared in the jails at Allahabad and Ghazipur only; there were five cases in the former jail and eight in the latter. The disease was very prevalent in the neighbourhood of both jails, but the exact source of the cases in the jails could not be traced. So far as could be ascertained there was no connection between the different cases which occurred, but the superintendent of the Ghazipur jail thought that the infection might have been spread by the agency of flies. Dysentery was much less prevalent and much less fatal than in 1909, and this was attributed by the Inspector-General to the much better health and condition of the prisoners admitted to jail. No death from the disease occurred in the Gorakhpur jail and only one in the Saharanpur jail; these are the two jails in which the disease is usually most prevalent and fatal The admission rate from malaria was only 123 per thousand compared with 212 in 1909. In view of the greatly diminished prevalence of fever among the general population during the year under review the Inspector-General was not disposed to attribute the decline of malaria among the prisoners to the prophylactic administration of quinine which is carried out in all jails, but he considered that the issue is a very useful measure which should certainly be continued. Tubercle of the lungs caused only 159 admissions to hospital and 60 deaths as compared with 261 and 84 in the previous year and pneumonia only 359 admissions and 75 deaths as compared with 583 and 143.

Punjab.

73. The Punjab was one of the provinces in which during 1910 the jail population was larger than during 1909. The number of prisoners who passed through the jails increased from 57,196 to 59,297, the number received increased from 45,433 to 47,189, and the daily average strength increased from 11,526 to 11,875. The accommodation in the jails is for 14,400 prisoners of all classes, but during the year under review the superintendents of a number of jails found great difficulty in meeting the requirements of class distribution, and as regards the central jails the accommodation was always insufficient. It is said that overcrowding was avoided by the use of worksheds and tents, but this expedient is quite inadequate to prevent the high death rates which nearly always accompany figures like those given in the marginal statement. The Inspector-General notes that the remedy of providing more space in the district jails of Lahore and Sialkot is now being applied.

Jails.	Number of prisoners for whom accommodation is available	Daily average strength in 1910.	Maximum population on any one day in 1910.
Montgomery, Central ...	1,499	2,331	2,464
Lahore, Central... ..	1,309	1,560	1,680
Lahore, District... ...	556	596	1,186
Multan, District ...	655	650	824

The ratio of admissions to hospital was lower than in 1909 but the death rate rose to the high figure of 28·63 per thousand which compares very unfavourably with any rate recorded in recent years. There were in all 340 deaths, of which the central jails at Montgomery, Lahore and Multan with death rates respectively of 34·32, 32·69 and 40·48 per thousand contributed about half. Cholera and plague were entirely absent from the jails of the province and pneumonia and malaria were less prevalent than in the previous year, so we are left with dysentery and tubercle of the lungs as being the most important diseases to which the high mortality of the year was due. The admission rate from dysentery was 46·6 per thousand and the death rate 3·87 as compared with 38·9 and 1·91 per thousand respectively in 1909. The total number

of cases was 553, of which 247 (with 21 deaths) occurred in the Montgomery central jail. The disease in this jail was said to be of the bacillary type. Continued efforts were made to ascertain the source and mode of infection without success. Preventive measures were directed chiefly to securing the cleanliness of everything connected with the food-supply. The outbreak declined rapidly in June and July, but whether this was due to seasonal conditions or to the preventive measures adopted, the superintendent was unable to say. The admissions and deaths from tubercle of the lungs during each of the last five years are shown in the margin. The increase is a question of grave concern and the local Government has appointed Major W. C. H Forster, I.M S., to conduct a special enquiry into the conditions favouring the prevalence of the disease among the jail population. In 1909 a special ward for the segregation of tuberculous patients was added to the Montgomery central jail and in the year under review each of the central jails was provided with a steam disinfector of modern design. Only three deaths were ascribed to malaria during the year and the Inspector-General notes that in no case was the diagnosis confirmed by a satisfactory test. The practice of administering 15 grains of quinine once a week during the four autumn months to all prisoners was continued " with the usual success."

TUBERCLE OF THE LUNGS.

Years.	Admissions.	Deaths.
1906	86	45
1907	118	43
1908	155	70
1909	177	63
1910	217	78

74. With an increase of about 1,000 in the number of prisoners who passed through the jails of the North-West Frontier Province during 1910 the daily average strength rose from 1,354 in 1909 to 1,436, and although the accommodation in the five jails of the province is for 1,609 prisoners there was unavoidable overcrowding in all the jails for a part of the year. The rate of admission to hospital fell from 1,021 per thousand to 871 and the constantly sick rate from 27 to 26, but the death rate rose from 20·68 to 23·68, which, however, represents an increase of only six deaths as compared with the number in 1909. The total number of deaths among all classes of prisoners was 34, of which four were due to tubercle of the lungs, five to pneumonia and two to dysentery. There was no cholera, small-pox, plague or typhus fever in any jail, and malaria, dysentery, tubercle of the lungs and pneumonia were all less prevalent than in the previous year. The admission rate from malaria was 353 per thousand as compared with 504 in 1909 and no death was attributed to it during the year. Quinine prophylaxis is carried out in all jails and every superintendent reported favourably upon it.

North-West Frontier Province.

75. The health statistics of the prisoners in the Central Provinces were unfavourable, the constantly sick rate rising from 18 per thousand in 1909 to 21 and the death rate from 15·59 to 36·52. Except malaria all the chief diseases were more prevalent, or more fatal, or both, but the great increase of the death rate was due chiefly to dysentery and tubercle of the lungs which caused between them 84 deaths out of a total of 146. Dysentery was exceedingly prevalent in the central jail at Raipur, the admission rate being 310 per thousand and the death rate 74·92, which means that on an annual average strength of 654 there were 203 admissions to hospital and 49 deaths from this disease. The outbreak was believed to have been due to the admission into the jail of two batches of prisoners from the Bastar State. For safety these prisoners had been spread over different parts of the jail and it was thought that from some of them who were affected with dysentery before their arrival the disease was communicated by direct or indirect contact. In the Nagpur central jail, where 90 cases and eleven deaths occurred, the disease was also of a very infectious type and rapidly spread to all the barracks except those for women and for adolescents, the occupants of which were kept strictly separated from other prisoners. Tubercle of the lungs caused 41 admissions and 19 deaths as compared with only 17 and seven in 1909. Thirteen of the deaths occurred in the central jails at Raipur and Nagpur. The Inspector-General considered that the blankets supplied to prisoners are a fertile source of infection and laid stress upon the necessity for their thorough disinfection. Cholera caused four cases and one death, all in the district jail at Bilaspur, small-pox three non-fatal cases and enteric fever three cases with two deaths. Malaria was almost the only disease which was less prevalent than in 1909, the admission rate being 105 as compared with

Central Provinces.

151 and the death rate ·75 as compared with 1·16. Quinine prophylaxis was carried out in nearly all jails.

Madras.

76. The health of the prisoners in the Madras Presidency was very good, the rate of admission to hospital falling from 497 per thousand in 1909 to 451, the constantly sick rate from 25 to 21 and the death rate from 25·24 to 15·25, which is the lowest rate on record for the jails of this Presidency. The deaths from all causes numbered only 161 as compared with 273 in the previous year and of them 41 were due to dysentery, 28 to tubercle of the lungs and 17 to pneumonia. Dysentery caused most deaths in the Trichinopoly central jail in which, it was said, some further sanitary improvements are needed. The admission rate from tubercle of the lungs was 9·4 per thousand and the death rate 2·65 as compared with 10·1 and 3·88 respectively in 1909. The special wards for tuberculous prisoners at Trichinopoly and Bellary were full throughout the year and proposals to add another ward to the Trichinopoly jail have been approved. Pneumonia was prevalent and fatal in the jails at Vizagapatam and Cannanore. It is said that the prisoners admitted into the Vizagapatam jail are usually emaciated and "sodden with malaria." The Inspector-General notes that the Cannanore jail leaves much to be desired from the sanitary standpoint. The admission rate from malaria was as usual lower than in any other province except Burma, but it was slightly higher than in 1909. Quinine was issued as a prophylactic in seven jails, the doses and period of administration being left to the discretion of the medical superintendents. No case of cholera or plague occurred during the year.

Bombay.

77. The death rate of the prisoners in Bombay during 1910 was the lowest on record for the Presidency.

The number of prisoners who passed through the jails rose from 91,265 to 95,031 and the daily average strength from 7,591 to 8,071 In ten prisons there was constant or temporary overcrowding which was relieved as far as possible by transfer and by causing the surplus population to sleep in sheds or, when the climate was favourable, in the open.

The rate of admission to hospital fell from 580 per thousand in 1909 to 511, the constantly sick rate from 28 to 25 and the death rate from 17·92 to 14·62 which is lower than the rate in any other province except Burma. Nearly all the principal diseases except dysentery shared in the decreased sickness. Cholera was entirely absent from the jails and there was only one case of plague. The number of admissions from tubercle of the lungs was less by three than in 1909 and the deaths fell from fifteen to eight. The Inspector-General notes that the plans of a ward for tuberculous prisoners at Yerrowda are being prepared. Pneumonia was slightly less prevalent and considerably less fatal than in the previous year.

The admission rate from malaria (96 per thousand) was lower than in any other province except Madras and Burma, but the disease was very prevalent in the Sind districts and there were four deaths from it in the Hyderabad central prison and two among the prisoners of the Sind gang, who suffered some unavoidable exposure and discomfort from the flooding of the prison enclosure by unusually heavy rain in the first week of July. Quinine was issued as a prophylactic "in most jails," the usual dose being ten grains twice weekly from August to December, and it was said that the administration contributed largely to the good health of the prisoners. Although the admission rate from dysentery increased, the death rate fell from 1·98 to ·99.

Burma.

78. The daily average strength of the prisoners in Burma increased from 13,680 in 1909 to 14,774 and there was considerable overcrowding in most of the Lower Burma jails. On the whole the general health of the prisoners was satisfactory, for the rates of sickness and mortality from all causes were as usual, much lower than in any other province, and although the admission and constantly sick rates were almost the same as in 1909, the death rate fell from 16·15 per thousand to 11·98 which, excepting the rate in 1907, is the lowest on record for the jails of this province. Influenza, fevers, pneumonia and respiratory diseases were more prevalent than in the previous year, but cholera, dysentery, diarrhœa, tubercle of the lungs and a number of minor diseases declined. Cholera, which had caused 47 cases and 32 deaths in 1909, was responsible

for only six cases and four deaths, this lessened mortality being the chief reason for the fall in the total death rate. Tubercle of the lungs was the principal cause of death during the year, but there were only 99 admissions to hospital and 43 deaths from it as compared with 110 and 58 in the previous year. The great majority of the cases occurred in the jails of Lower Burma in which, as already mentioned, overcrowding was common. Myingyan has been selected as the most suitable place for a jail for tuberculous prisoners and plans for the accommodation of 100 prisoners in a separate annexe to the jail there have been prepared. The death rate from dysentery was 1·29 per thousand as compared with 1·68 in 1909. The disease is much less prevalent in the jails of Burma than in those of any other province and during 1910 in the great majority of the jails the number of cases did not exceed nine; the highest number was 45 with one death in the central jail at Bassein. Malaria is another disease of low prevalence in the Burma jails and in 1910 only two deaths were attributed to it Quinine was issued prophylactically in practically all jails, the dose being ten grains twice weekly. There were seventeen cases with six deaths recorded as due to enteric fever during the year, nine of them at Bassein and four at Insein. The cases occurred at fairly long intervals and there appeared to be no connexion between them. At Bassein two of the prisoners attacked belonged to the conservancy staff and arrangements were made for the inoculation of prisoners on that duty and for the incineration of all excreta.

Andamans.

79. The total rainfall in the Andamans during 1910 amounted to 114 inches which is less by 37 inches than in 1909 and less by 10 inches than the mean for the preceding five years. The average daily strength of the convicts was only 12,423 as compared with 13,145 in the previous year and except in the hospitals there was no overcrowding of barracks. The health of the convicts was, as usual, very bad, but the statistics were slightly more favourable than in the previous year, the rate of admission to hospital falling from 1,761 per thousand to 1,566, the constantly sick rate from 94 to 90, and the death rate from 41·38 to 40·01. Malaria, dysentery and tubercle of the lungs are the chief scourges of the Settlement. From malaria there were in all 12,362 admissions to hospital and 63 deaths, giving an admission rate of 995 per thousand and a death rate of 5·07 as compared with 1,075 and 4·56 in 1909. The disease was most prevalent from May to September. In addition to the cases in which malarial parasites can be found, several types of disease which from lack of knowledge of their etiology are at present classified under this heading, occur in the Settlement. The symptoms of one of them are said to resemble those of yellow fever and another is a long continued undulating fever which is not Malta fever and is followed by profound anæmia. The Senior Medical Officer reports that in smears of blood from some of these cases bodies consisting of a dot of chromatin surrounded by a small amount of protoplasm have been found in the red blood corpuscles. Anopheles mosquitoes are abundant especially in the western district, but the islands of Ross and Chatham are reported to be free from them. The presence of both Malta and enteric fever in the Settlement has been reported, but cases of these diseases appear to be rare. The whole subject of the malarial and other fevers of the Andamans urgently needs investigation and arrangements have been made for this to be undertaken by Major Christophers, I.M.S., during the current year. Dysentery was less prevalent than in 1909 and the death rate fell from 8·98 to 7·41. Many of the cases were said to be malarial in origin. Tubercle of the lungs caused 183 cases and 106 deaths, the admission rate being 14·7 per thousand and the death rate 8·53 as compared with 8·4 and 7·00 in the previous year. The statistics of the disease indicate that only a comparatively small proportion of the cases occurring in the Settlement are detected at an early stage. The admission rate on account of pneumonia rose from 18·2 per thousand in 1909 to 19·2, and the death rate from 6·24 to 7·08.

SECTION V.

VACCINATION.

Vaccination in India.

80. The total number of vaccinations and revaccinations performed among the civil population in all provinces in British India during 1910-11 was 9,081,194, as compared with 9,090,586 in 1909-10. The decrease was confined to revaccinations the number of which fell from 994,353 in 1909-10 to 794,594 in 1910-11, all provinces, except Bombay, Burma, Coorg and Ajmer-Merwara, sharing in the decrease.

The vast majority of the operations were, as usual, primary. These numbered 8,286,600 or 190,367 more than in 1909-10 and all provinces contributed to the increase except Eastern Bengal and Assam, Madras and Bombay.

The only two provinces in which both primary vaccinations and revaccinations were fewer than in 1909-10 were Eastern Bengal and Assam and Madras. The difference in the total number was 79,613 in the former province and 105,844 in the latter. The main reasons for the decline in Eastern Bengal and Assam were said to be opposition from certain communities and the difficulty of recruiting vaccinators locally in some districts, while in Madras the reduction in the number of vaccinators, incomplete staff, and the short supply of lymph were regarded as the principal causes.

The percentages of success in primary operations varied between 99·07 in Bengal and 87·57 in Madras, and in revaccinations between 90·10 in Ajmer-Merwara and 61·34 in Bombay. This amount of variation is unusual especially as regards primary vaccinations. The mean number of operations performed by each vaccinator fell from 1,477 in 1909-10 to 1,467 in 1910-11, the figures ranging from 3,065 in the North-West Frontier Province to 1,915 in the Central Provinces and Berar and 881 in Ajmer-Merwara.

The number of operations at dispensaries fell from 156,478 in 1909-10 to 147,673 in 1910-11, and the decline is likely to be greater each year, as the work is transferred to the special staff. Except in Bengal and Burma, dispensary vaccination is now relatively infrequent, and in Ajmer-Merwara no vaccinations, are done at dispensaries.

The mean proportion of the population successfully vaccinated fell from 35·55 per thousand in 1909-10 to 35·06 in 1910-11, the extremes being reached as in last year in the two small provinces of Coorg (73·56) and Ajmer-Merwara (26·73). Estimating the birth rate in each province as usual at 40 per mille, the percentage of infants protected rose from 44·20 in 1909-10 to 46·44 in 1910-11. This is considerably in excess of the highest figure previously recorded, namely, 44·36, in 1907-08. The percentages, however, varied greatly in the provinces, namely, from 81·74 in the Central Provinces and Berar to 46·98 in the United Provinces, 17·34 in Burma and 9 in Coorg.

The aggregate cost of the special establishments in the different provinces was Rs. 15,04,523, as against Rs. 15,64,490 in 1909-10. The mean cost of each successful operation was three annas, but the cost ranged from nine annas three pies in Bombay to one anna five pies in Bengal.

Supply of vaccine.

81. Particulars regarding the kinds of lymph in use and the sources of its supply will be found in the paragraphs relating to the several provinces. The more important changes during the year were the occupation of the new Vaccine Institute at Belgaum, the abolition of the Animal Vaccination Depôt at Darjeeling and the opening of a new vaccine depôt in Burma at Loimwe to provide lymph more readily to the interior. The vaccine depôt at Shillong is not considered suitable for the province of Eastern Bengal and Assam, and it is possible that a new depôt more in accordance with modern requirements may be shortly established on the model of that at Belgaum.

Bengal.

82. The total number of operations performed in Bengal was 2,035,130, as compared with 2,053,773 in the previous year. Of the total for the year 1,929,222, or 60,637 more than the year before, were primary cases, and 105,908, or 79,280 less were revaccinations,

giving a net decrease of 18,643. Of the 33 districts in the province, 17 show an increase and 16 a decrease; among the former the more noteworthy were Balasore (11,713), Ranchi (9,818), Saran (9,513) and Singhbhum (9,264). The better work in some of these districts stands to the credit of the department and to the interest exhibited by Civil Surgeons, while as to the smaller outturn in others the cause is ascribed to the absence of an epidemic of small-pox. The percentage of successful primary operations rose from 98·97 in 1909-10 to 99·07 in 1910-11, but that for revaccinations fell from 63·26 to 62·06. The mean number of operations performed by each vaccinator was 1,072, the work of the licensed vaccinator being on this occasion greater in quantity than that of the special staff.

There is a steady increase in infant vaccination from year to year, and during 1910-11, 51·93 per cent. were protected, compared with 48·16 and 43·91 in the two previous years. As in 1909-10 more than half the available infants were protected in 24 districts, while the lowest rate recorded is about 30 per cent. in the district of Shahabad.

There was no change in the method of vaccination in use in the province. The following table shows the result under each method employed:—

	Primary cases.		Revaccinations.	
	No.	Percentage of success.	No.	Percentage of success.
Calf lymph	39,076	98·01	8,153	85·07
Lanoline „	1,261,364	98·62	87,856	58·81
Human „	606,325	99·28	4,458	60·25

The cost of the department fell from Rs. 2,13,696 in 1909-10 to Rs. 1,90,937, and the mean cost of each successful case from one anna nine pies to one anna six pies. This reduction may be partly accounted for by the abolition of the Darjeeling Animal Vaccination Depôt during the year, which was an expensive institution. This abolition was rendered possible by the introduction of a system of preserving lymph in a cold storage chamber at the Calcutta depôt, which enables a reserve of six months' supply being maintained there, and this is sufficient for the whole demands of the province.

Eastern Bengal and Assam.

83. The improvement noticed last year in the work of the Vaccination Department of Eastern Bengal and Assam during the preceding three years was not maintained during 1910-11. The total number of operations fell from 1,464,601 in 1909-10 to 1,384,988, and the percentage of successful cases was generally lower. The decline in the number of vaccinations is especially noticeable in the Dinajpur (47,100), Backerganj (43,967) and Rangpur (22,009) districts. In the Dinajpur and Rangpur districts, however, operations during 1909-10 were accelerated by a sharp outbreak of smallpox, and the numbers recorded during the succeeding year approximate to the average. In the Backerganj district the decline is attributed to the difficulty of realizing fees, which hampers the recruitment of vaccinators.

Of the total number of operations, 1,288,134 were primary cases with a percentage of success at the rate of 96·49, compared with 1,301,574 and 96·21 in 1909-10. There was a general decline in revaccination work, the number of operations falling from 163,027 in 1909-10 to 96,854 and the percentage of success from 75·61 to 67·12. Practically the whole work is done by the special staff, and the small number of operations (2,931) performed by the dispensary staff was confined to hill districts.

On the hypothetical birth rate of 40 per thousand only 28·33 per cent. of available infants were successfully vaccinated, as against 28·92 in 1909-10. The percentage is nearly twice as high in areas where the Vaccination Act is in force, and would be higher still were vaccination of children during the first year of life not so unpopular in the capital city of Dacca. Elsewhere in Eastern Bengal, however, except in a portion of the Mymensingh District, vaccination in compulsory districts has been distinctly good, and in 7 out of the 25 towns concerned practically every available child was vaccinated, and the percentage in most of the others was high. Such is not the case in the Assam portion of the province and the question is being considered whether the more stringent Provincial Vaccination Act should not replace the Imperial Act now in force.

Glycerinated vaccine prepared at the Shillong Depôt was exclusively used and the number of tubes loaded was 1,781,075 compared with 2,145,024 in 1909-10. An unusual number of complaints were received in the early part of the year as to the quality of the vaccine supplied, and as stated in another part of this report, proposals are under consideration to construct a new depôt on more modern lines than the present. The scheme provides for a cold storage room.

The cost of the department rose from Rs. 1,13,999 in 1909-10 to Rs. 1,16,702 in 1910-11, and the cost of each successful vaccination from one anna four pies to one anna six pies.

84. The total number of persons vaccinated in the United Provinces in 1910-11 was 1,416,295 compared with 1,372,086 in the previous year. The primary cases which numbered 1,343,397 were 72,445 more than in 1909-10, but the revaccinations, which numbered 80,835 were 24,900 fewer. The percentage of success in primary cases showed a slight improvement, 97·74 compared with 97·55 the year before, but in revaccination the percentage of success was 79·13 to which it fell from 81·85. Compared with the preceding year's work, 39 districts showed an increase in the number of successful primary operations, the largest rise occurring in Aligarh (8,024), Gorakhpur (6,185) and Bareilly (5,649). Of the districts showing a decrease Ghazipur heads the list with a fall of 2,976 cases, the explanation being slackness on the part of some vaccinators. Various causes are assigned for the decreases in other districts such as the evacuation of villages on account of plague and the employment of fewer vaccinators.

United Provinces.

On the hypothetical birth rate of 40 per thousand, 46·98 per cent. of the available infants were successfully vaccinated, against 40·50 and 41·39 in the two preceding years.

During the year under review 204 calves were received at the Bovine Lymph Depôt at Patwa Dangar. Of these 175 were successfully vaccinated and the total quantity of crude lymph obtained was 5,983·9 grammes, as against 5,157·6 from 111 calves in 1909-10. The decrease in the lymph obtained per calf is due to the fact that doubtful vesicles are now discarded, and only the best used for lymph collection, and that calves are not now vaccinated in the groin, mammary area, etc. These are distinct improvements in method, as by the first the strain of lymph is materially strengthened and by the second a good deal of pain is saved to the animals. Glycerinated calf-lymph was supplied to all District Superintendents of Vaccination, and is becoming increasingly popular. The percentage of success in the cases in which it is used shows that the strain is eminently satisfactory. Calf-lymph vaccination is steadily replacing arm to arm vaccination and it is hoped that in the near future it will be possible to supply sufficient lymph from this depôt to stop the latter method in the province altogether.

85. It is satisfactory to record that in the Punjab after two successive years in which the total number of vaccination operations declined, as a result of the severe epidemic of malaria and plague in 1908-09 and 1909-10 respectively, there was in 1910-11 an increase of 94,539 operations compared with the previous year, and 96,177 with the year before. Of the total of 765,075 operations 636,697 were primary cases and 128,378 revaccinations, the former showing an increase of 108,350 over the figures for 1909-10, and the latter a decrease of 13,811. The reason assigned for the decrease in the number of revaccinations is the same as that given in previous years, namely, the reluctance of uneducated people to submit to an operation they regard as unnecessary

Punjab.

from a fear that it will interfere with their ordinary labours for a time. The percentage of success in primary operations again fell this year from 97·58 in 1909-10 to 97·20 and in revaccinations from 74·32 to 73·21. This decline is attributed to two remediable causes, namely, diminution in the potency of the lymph issued at one time of the year and the unauthorised use of vaccine beyond the date prescribed on the capsule. The local authorities are taking steps with regard to the former and the local Government have under consideration a scheme by which it is hoped both the quality and potency of the vaccine supplied from the Provincial Institute will be improved. This is a matter of some importance, as the vaccination operations in the whole province are now performed with chloroformed glycerinated vaccine supplied from the one institute, and from which the outturn continues steadily to increase.

A further trial was given to the house to house system of vaccination, and about seven per cent. of the total number of operations were so performed. The experiment, however, does not seem to make any headway with the people, who are suspicious of the visits of the public vaccinator, even when the saving in time and trouble is realised. The system is fairly successful in the larger towns and villages and in these it may become established in course of time.

The percentage of annual estimated births at 40 per thousand of the population successfully vaccinated showed an appreciable increase compared with the previous year, the figures being 61·42 and 49·58 respectively. This improvement is said to be due to the action taken last year by the local authorities in enforcing the provisions of the Vaccination Act in towns to which it has been extended.

The cost of the department increased from Rs. 1,20,509 to Rs. 1,21,076, but the cost of each successful vaccination fell from three annas three pies to two annas ten pies.

North-West Frontier Province.

86. The number of vaccinations performed in the North-West Frontier Province continues to increase steadily. There were 107,566 operations during 1910-11, compared with 102,567 in the previous year. The increase is confined to primary vaccination, of which 99,719 operations were performed, compared with 94,701 in 1909-10, but revaccinations decreased by only 19. It is very satisfactory to note that vaccination is steadily replacing inoculation in the frontier province, and continued efforts are being made to enrol as vaccinators the inoculators, whose occupation is usually hereditary, and who have some influence in the areas in which they work.

The percentage of success in primary operations also continues to improve and in 1910-11 was as high as 99·06 compared with 98·67 in the previous year. No reason has been given for the decline in the percentage from 82·76 to 72·95 in revaccinations. The percentage of unknown cases was much the same as in the previous year, and it is not surprising to find that the largest number of such cases occur in the political agencies which form a *pied à terre* for transfrontier tribes on their way to and from independent territory.

The ratio of persons successfully vaccinated was 46·55 per thousand of the population, compared with 47·36 in 1909-10. Estimating the birth rate at 40 per thousand, 69·21 per cent. of the infants were protected, as against 70·31 in the previous year.

All the operations were performed with chloroformed glycerinated lymph from the Punjab Vaccine Institute, and its universal use has removed the friction which formerly existed between the vaccination staff and the villagers, and has helped to popularise vaccination on the frontier. The supply is stated to have been satisfactory throughout.

The cost of the department fell from Rs. 14,744 in 1909-10 to Rs. 14,266 in 1910-11 and the average cost of each successful vaccination from two annas five pies to two annas three pies.

Central Provinces and Berar.

87. In the Central Provinces and Berar there were 581,506 primary operations during the year 1910-11 or 45,409 more than in 1909-10, the increase being partly due to a return to more normal conditions and partly to an improvement in the work of the department. The number of revaccinations showed, however, a slight decrease compared with the previous year, 73,008 operations having been performed as against 73,909. Primary vaccinations were successful at the rate of 98·71 per cent. and revaccinations at the rate of 73·92 against

99·15 and 77·67, respectively. Dispensary vaccination has practically ceased to exist as sub-assistant surgeons are now not allowed to perform the operation except in very special cases, such as during the prevalence of small-pox, and the number of vaccinations performed by the dispensary staff practically represents the work done in jail and railway hospitals.

The reported percentage of infants in the Central Provinces successfully vaccinated is the highest in India, and during 1910-11 it is estimated that 81·74 per cent. were protected, but in several districts where school children were inspected, a large proportion did not show signs of protection.

Only glycerinated calf-lymph was used throughout the province and in most cases it was prepared at the headquarters of each district. The local authorities consider this a better and more economical plan than that adopted in all the other larger provinces of having one central depôt. It is considered that by means of separate district laboratories, the staff is kept in closer touch and the result of each vaccination more easily traced. In some districts, difficulty was experienced in obtaining the loan of calves for vaccination, while in others a larger number than necessary were vaccinated.

The cost of the department rose from Rs. 67,819 in 1909-10 to Rs. 68,684 in 1910-11 mainly on account of the entertainment of additional Assistant Superintendents and the construction of a lymph depôt at Ghanda. The mean cost of each successful case was one anna ten pies as against one anna eleven pies in the previous year.

Madras.

88. In Madras the total number of vaccination operations was 1,546,184 as against 1,652,028 in 1909-10, and all but 17 of these were done by the special department, which cost Rs. 2,90,102 as against Rs. 3,27,774 in the previous year. Of the total number of operations, 1,368,173 were primary cases and 178,011 revaccinations. The percentage of success in the former was 87·57 and in the latter 72·41.

The largest decrease in the number of operations performed occurred in the Vizagapatam district, and is attributed to the absence of small-pox and the employment of vaccinators on the Census operations. In Salem and North Arcot where the number of operations fell by 18,138 and 14,187 respectively, the cause is ascribed to a reduction in the number of vaccinators, absence of vaccinators without proper substitutes and short supply of paste, and in Gantur where the decrease amounted to 14,843, to the absence of small-pox and to the prevalence of cholera and famine.

The King Institute of Preventive Medicine supplies all the lymph used in the Presidency. Lanolinated and glycerinated vaccine is manufactured, the virus used being the same in both cases. The latter gives the better percentage of success, but as it rapidly deteriorates if once exposed to a high temperature, it is supplied only where it can be rapidly used, and the Madras Corporation took 26,525 cases of the 27,090 issued. The rate of success with this lymph was over 97 per cent., as against 87·0 with lanoline vaccine. This latter rate has not only fallen below the average of previous years, but compares unfavourably with the results obtained elsewhere, and the cause is attributed purely to local conditions, for the removal of which a scheme is under consideration.

Although the strength of the staff employed was practically the same as in 1909-10, the cost of the department fell from Rs. 3,27,774 to Rs. 3,23,779, but the average cost of each successful case rose from three annas eight pies to four annas two pies. During the last ten years the ratio of successful vaccinations per thousand of population has varied between 30·0 and 39·19 and the small-pox death rate has varied between ·3 and ·8 per thousand.

Coorg.

89. The number of vaccinations performed in Coorg rose from 11,971 in 1909-10 to 16,154, and consisted of 9,360 primary cases and 6,794 revaccinations, which succeeded respectively at the percentages of 93·79 and 72·69. The general improvement indicated in these figures is very satisfactory. The percentage of successful vaccination among infants, however, showed a further decline compared with the two previous years, falling from 12·15 in 1908-09 to 9·77 in 1909-10 and to 9·00 in 1910-11.

The cost of the department was exactly the same as last year, *viz.*, Rs. 2,813, but the cost of each successful vaccination fell by one anna to three annas five pies.

Bombay.

90. The total number of operations in the Bombay Presidency in 1910-11 was 721,319, as compared with 714,878 in 1909-10, the increase being in revaccinations which rose from 48,961 to 59,408. Revaccination in the Bombay Presidency is chiefly confined to large towns and varies according as to whether small-pox is prevalent or not. The number of primary operations was 661,911, compared with 665,917 in the previous year. They were successful at the rate of 98·76 per cent. as against 98·96 in 1909-10.

The following table shows the preparations of lymph used in the several "districts," and the degree of success attained with each kind :—

Districts.	Kind of lymph used.	Number of operations.		Successful cases excluding "unknown."		Percentage of success excluding "unknown."	
		Primary	Re-vaccination.	Primary.	Re-vaccination.	Primary.	Re-vaccination.
Western Registration District ...	Glycerinated ...	120,760	11,589	107,520	5,717	97·88	67·70
Presidency Circle	Animal	4,557	5,911	4,129	10	98·99	45·45
	Glycerinated ...	12,419	12,360	10,984	37	97·07	23·87
Central Registration District ...	Human	395	20	362	9	97·57	56·25
	Glycerinated ...	153,597	3,680	138,063	1,817	99·57	71·88
Southern Registration District ...	Human	17,453	717	17,425	529	99·93	74·72
	Animal	3,578	144	3,573	110	99·94	79·39
	Glycerinated ...	121,900	13,955	114,981	6,642	99·31	64·47
Gujarat Registration District ...	Human	29,864	1,217	29,304	581	98·94	48·16
	Glycerinated ...	97,154	4,344	90,703	1,844	99·17	55·73
Sind Registration District ..	Human	82,387	1,000	74,041	554	98·67	83·56
	Animal	6,066	1,289	5,838	641	99·91	88·05
	Glycerinated ...	1,219	125	860	17	79·48	16·34

Except in the Sind Registration District a large proportion of the work was done with preserved lymph, and the results show a great improvement over previous years. The use of this lymph has greatly facilitated the work of vaccinators, and as they attain more experience and greater skill the results will continue to improve. It is now used throughout the greater part of the presidency and its introduction into Sind has been delayed only because of the want of adequate cold storage.

On the estimated birth rate of 40 per thousand, 56·56 per cent. of the children available were protected, compared with 57·02 in 1909-10. The decline is doubtless due to an increase in the number of "unknown" cases, an increase attributed partly to the growing disinclination of parents to show the results of vaccination from the fear that their children may be asked to act as vaccinifers.

The cost of the department continues to increase, and in 1910-11 amounted to Rs. 3,56,870, as against Rs. 3,47,974 in 1909-10. The mean cost of each successful case rose from eight annas ten pies to nine annas three pies, which is higher than in any other province.

Burma.

91. The number of operations performed in 1910-11 exceeded the number performed in the preceding year by 5,321, and totalled 413,026, made up of 355,781 primary operations and 57,245 revaccinations as against 353,616 and 54,089, respectively, in 1909-10. The cost of the department rose from Rs. 1,80,784 in 1909-10 to Rs. 1,93,279 in 1910-11.

In primary cases success was attained at the rate of 95·50 per cent. against 95·26 in the preceding year, and in revaccinations at the rate of 67·60 against 62·81. At dispensaries 8,268 primary operations and 9,865 revaccinations were performed, with percentage of success in the former case of 95·73 compared with 94·82 and in the latter case of 66·81 compared with 70·03 in 1909-10.

There are now three vaccine depôts in Burma, at Meiktila, Rangoon and Loimwe.

92. In Ajmer-Merwara, 13,100 primary operations and 306 revaccinations were performed during the year, compared with 11,875 and 85, respectively, in 1909-10. The percentage of success rose from 97·12 to 97·49 in primary cases and from 87·06 to 90·10 in revaccinations. The number of infants successfully vaccinated is estimated at 51·20 per cent. as against 47·76 in 1909-10. The cost of the department rose from Rs. 3,033 in 1909-10 to Rs. 3,115, but the average cost of each successful vaccination fell from four annas two pies to three annas eleven pies.

Ajmer-Merwara.

93. Particulars of vaccination in the Army will be found in statement III of the annual report of the Sanitary Commissioner with the Government of India.

Vaccination among troops.

SECTION VI.

MEDICAL INSTITUTIONS.

(CONTRIBUTED BY THE DIRECTOR-GENERAL, INDIAN MEDICAL SERVICE.)

A.—Civil Hospitals and Dispensaries (State General, Local Fund, and Private-aided.)

94. The State General, Local Fund and Private-aided hospitals and dispensaries in British India number 2,670, an increase of 32 on the corresponding figure for last year

India.

In every province more would be provided if funds were available. The total expenditure amounted to £783,123, an increase of £2,123 on the figure for last year; towards this amount Indian subscriptions brought in £47,278 as compared with £40,600, a satisfactory increase but still capable of improvement. As usual the amount of Indian subscriptions varied very much in different parts of the country; in Bengal and Calcutta they represented 10 per cent. of the whole receipts, whereas in the Punjab the corresponding proportion was 3½ per cent. and in Bombay 1½ per cent. The year was a healthy one, and the increase in the number of persons treated was less marked than usual; nevertheless the total treated were 28·34 millions, or a quarter of a million more than in the previous year. The number of operations performed continues to rise.

The following statement shows in tabular form the main features of the operation of these hospitals and dispensaries during 1909 and 1910:—

Province.		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of Patients.	Number of Operations.
Eastern Bengal and Assam	1909	353	25,755	3,440,313	3,466,068	79,889
	1910	360	24,322	3,524,639	3,548,961	80,769
Bengal (excluding Calcutta)	1909	345	43,923	3,069,474	3,108,897	140,218
	1910	351	43,269	3,074,176	3,117,445	139,906
Calcutta	1909	15	25,207	302,949	328,156	33,909
	1910	15	24,752	311,702	336,454	35,301
United Provinces ...	1909	376	69,741	4,866,858	4,936,599	188,045
	1910	382	69,736	4,474,100	4,543,836	190,871
Punjab	1909	299	77,935	4,433,816	4,511,751	220,243
	1910	300	75,202	4,222,251	4,297,453	220,094
North-West Frontier Province	1909	49	11,304	688,492	699,796	29,109
	1910	50	11,357	760,274	771,631	30,716
Central Provinces ...	1909	166	13,776	1,765,284	1,779,060	44,307
	1910	167	13,808	1,775,965	1,789,773	40,831
Burma	1909	184	53,488	1,188,015	1,241,503	37,670
	1910	187	55,277	1,316,994	1,372,271	40,470
Madras	1909	501	75,795	5,469,623	5,545,418	211,216
	1910	506	77,633	6,007,735	6,085,368	215,994
Bombay	1909	325	51,673	2,198,538	2,250,211	84,143
	1910	327	54,612	2,207,073	2,261,685	90,123
Baluchistan ...	1909	25	3,867	221,758	225,625	5,391
	1910	25	3,933	214,560	218,493	4,824
Total ...	1909	2,638	452,464	27,640,620	28,093,084	1,074,131
	1910	2,670	453,901	27,889,469	28,343,370	1,089,899

95. Six dispensaries have been opened, bringing the total up to 351. Building operations in many of the existing institutions have increased the available accommodation.

Bengal (excluding Calcutta.)

There was a slight decrease in the number of in-patients, which is ascribed to heavy floods in two divisions, and an outbreak of plague.

Malaria accounted for 26·16 per cent. of the admissions, and the price of quinine has been reduced so as to popularise the sale of the drug. The "pice" packet now contains 10 grains instead of 7. The sale has increased from 1,200,000 to over 1½ million packets, and from about ½ million to 1 million tablets of quinine.

The pay and prospects of sub-assistant surgeons have been improved considerably.

The number of women and children presenting themselves for treatment has largely increased.

Expenditure during the year was £65,967, the decrease being due to restriction of new works; of this sum subscriptions from Indians brought in £ 11,285. Only 13·4 per cent. of in-patients paid for their own diet in hospital.

96. The total number of sick treated has increased from 328,156 to 336,454, and the number of beds available from 1,432 in 1908 to 1,724.

Calcutta.

The system of nursing in the large hospitals has been completely changed, and the staffs reorganised. It is anticipated that benefit will result from the change.

The total expenditure was £ 77,000, a reduction on last year's figure by £16,857; this is due to the completion of the extensive building operations that have been in progress for some time past. Receipts from paying patients amounted to £9,640; and subscriptions and donations from Indians fell to £ 3,500.

97. One dispensary was opened, bringing the total up to 167. There is a slight increase in the number of cases treated; the Inspector-General reports that the growth of an independent medical profession is beginning to influence the numbers of individuals treated in hospitals. A system of payment for treatment is being tried, but no conclusion has yet been arrived at as to its success. There is still a great shortage of sub-assistant surgeons, which is embarrassing to the medical administration.

Central Provinces.

The total expenditure amounted to £ 31,000, and of this sum £ 4,100 represent subscriptions by Indians.

98. Seven new dispensaries have been opened. The total number of patients treated has now risen to over 3½ millions, or an increase of 14 per cent. during the triennium.

Eastern Bengal and Assam.

Attendance at the female dispensaries is increasing steadily, but the proportion of females to males treated is still low—only 21 to 100 in the case of Hindus, and 17 to 100 among Musulmans. As funds permit more female sub-assistant surgeons and midwives will be provided.

Of in-patients only 14 per cent. dieted themselves when under treatment.

The total expenditure amounted to £ 46,082, and Indian subscriptions brought in £ 5,486, an increase of nearly £ 1,000 on last year's figure.

The pay of sub-assistant surgeons and compounders has been increased.

99. The number of dispensaries has risen from 376 to 382, but there was a considerable decline in the number of out-patients treated, from 4,936,599 to 4,543,836. This was entirely due to diminished prevalence of malarial fever during the year. The institution of travelling dispensaries, with the primary function of distributing quinine, continues to be a success; and much excellent work is done by this agency.

United Provinces.

Efforts are being made to improve the quality and increase the numbers of dhais, and the high rate of infant mortality demands active measures in this direction.

The construction of the new Medical College at Lucknow is proceeding rapidly, and the hospital attached thereto will be ready in 1913.

The improvement in the pay of sub-assistant surgeons has resulted in brisk recruitment and the establishment is now up to strength.

Total expenditure amounted to £90,000 of which sum £13,050 were met by native subscriptions—an increase of £ 4,000 on last year's figures.

Punjab.

100. The year was a healthy one, and the total number of sick treated fell from about $4\frac{1}{2}$ to $4\frac{1}{4}$ millions. It is at present uncertain whether the system of charging well-to-do patients for attendance has affected the numbers seeking medical relief.

The pay of sub-assistant surgeons has been improved during the year, and more civil surgeoncies have been opened to the assistant surgeon class.

The total expenditure was £ 72,216, or about £ 7,500 less than last year; expenditure on buildings was reduced very largely, and the cost of medicines and diets for the sick fell considerably. Subscriptions from Indians amounted to £ 2,572, as compared with £ 2,000 last year.

Bombay.

101. There has been an increase in the number of patients, and of operations performed. It is noticeable, however, as usual, that the figures are, proportionately, far lower than those of any other Province. Two million more cases were treated in the 300 dispensaries and hospitals in the Punjab than in the 327 institutions in Bombay. In this Presidency, however, the numbers treated in non-aided institutions are very much higher than elsewhere; and these independent institutions are themselves far more numerous than in other parts of India.

Expenditure amounted to £ 132,550, of which only £2,000 represent Indian subscriptions.

Madras.

102. The number of hospitals and dispensaries has now risen to 506, and the total of patients treated is over six millions, or three-quarters of a million more than in 1908; the year was a comparatively healthy one, without epidemics to account for the large increase.

The pay of sub-assistant surgeons has been improved, and it is hoped this will attract a better class of men.

The total expenditure amounted to £158,378 and towards this sum £ 1,710 represented native contributions. The cost of diets has risen by 30 per cent., and large expenditure has been incurred in improvement of hospitals and equipment.

Burma.

103. Three new dispensaries have been opened, and there has been a considerable increase in the numbers treated, amounting to a quarter of a million over the figure for 1908. More dispensaries are required to meet the needs of the population.

The new General Hospital, Rangoon, is attracting large numbers of Burman women and children.

The sub-assistant surgeon branch is still unpopular; the question of the improvement of their pay is under consideration. The civil assistant surgeon branch now holds out better prospects, and there is less difficulty in securing candidates.

The total expenditure amounted to £ 91,450; donations and subscriptions again amounted to £ 3,400.

Ten students are now under training as midwives, for employment by Local Bodies, and a few have already qualified. It is proposed, when funds permit, to start courses of sick nursing at the General Hospital for Burman and Karen women.

North-West Frontier Province.

104. A new dispensary has been opened, and considerable extensions have been made to existing accommodation in several of the larger institutions, notably Kohat, Teri Parachinar and Peshawar.

The number of out-patients has increased largely, and now exceeds three-quarters of a million; eye cases have been treated in very large numbers. The operations performed have risen from 28,969 to 30,716.

A scheme for improvement of the pay and prospects of the subordinate medical department is under consideration.

The expenditure for the year amounted to £12,350 and towards this sum only £158 were contributed by the Indian community.

105. There was a slight decrease in the number of out-patients, the result of a decline in the prevalence of malarial fever. Improvements were carried out in several of the dispensaries. The expenditure for the year amounted to £6,130, and Indian contributions were received to the extent of £17.

Baluchistan.

B.—Civil Hospitals and Dispensaries (State Special, Railway and Private non-aided.)

106. There are 451 State Special and 360 Railway, and 672 Private non-aided dispensaries and hospitals, as compared with 656 and 680, respectively, last year. The number of the latter is very much higher in Bombay than in other provinces, and the number of patients treated by agencies independent of the State is proportionately greater.

The annexed table shows the principal items of information regarding them—

Institutions.	In-patients.	Out-patients.	Total.	Operations.
1. State Special and Railway	93,920	2,070,048	2,163,968	38,694
2. Private, non-aided	33,415	4,553,848	4,587,263	218,231
Total 1910 ...	127,335	6,623,896	6,751,231	256,925
Total 1909 ...	141,257	6,551,341	6,692,598	164,321

The figures show a slight increase, especially among out-patients in the State Special and Railway hospitals.

C.—Lunatic Asylums.

107. The following table shows the strength of the asylum population in 1910, and the statistics of sickness and mortality.

Province.	Admitted and readmitted during 1910.	Total Asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Number of Criminal Lunatics.
		Males.	Females.	Total.					
Bengal	193	897	204	1,101	71	61	926·48	82·81	442
Eastern Bengal and Assam	148	576	94	670	53	62	524·89	33·77	327
United Provinces	260	1,058	356	1,414	139	84	1,157·00	113·47	219
Punjab	217	674	153	827	89	73	627·34	47·31	172
Burma	176	677	122	799	66	42	627·33	27·08	367
Central Provinces	88	310	86	396	43	80	298·17	4·31	102
Bombay	373	1,088	269	1,357	134	126	986·1	28	196
Madras	225	628	213	841	84	58	636·93	60·83	206
Total 1910	1,680	5,908	1,497	7,405	679	586	5,784·24	397·58	2,031
Total 1909	1,709	5,883	1,495	7,378	616	569	5,758·19	474·58	2,919

The figures closely approximate to those of 1909, except in so far as there was a considerable increase in the number discharged, cured, and a reduction in the daily average sick.

The total expenditure amounted to about £75,000, a little less than last year; and of this amount fees from paying patients brought in £6,800. Burma again covers a quarter of its expenditure from this source, whereas in Eastern Bengal the paying patients only produced £16 against a total of £3,600.

Bengal.

108. The asylum population was in excess of the capacity of these institutions, especially at Berhampore. Construction work on the new asylum at Ranchi is to be taken in hand at once and pressed forward. The general health was better than in 1909; the death rate was 6·58, which is better than the corresponding figure for County and Borough asylums in England, *viz.*, 9·96 per cent. The staff at Berhampore was increased.

Eastern Bengal and Assam.

109. There was considerable overcrowding, and to this, and the absence of a tubercle ward in the Tezpur asylum, the increase of tubercle in the latter is probably due. Steps are in progress to remedy these defects. The general health was satisfactory and there were fewer deaths.

United Provinces.

110. Accommodation is insufficient at Benares. The health has been better than last year, and deaths have numbered 84 as against 108. There was no epidemic in any of the asylums. The new tubercle ward at Bareilly is completed. The number of cases discharged cured continues to increase.

Punjab.

111. The average number of constantly sick shows an increase; it is hoped that, as a result of the increased accommodation in the hospital and the construction of a tubercle ward, there will be an improvement. The prevalence of bowel complaints is still under enquiry. The greatest difficulty is still experienced in obtaining suitable men as attendants, in spite of the increase of their pay; the attempt to obtain ex-soldiers has failed.

Burma.

112. Overcrowding has occurred again, but to a less extent. Some lunatics have been transferred to India, and additional accommodation has been provided at Rangoon. The number constantly sick rose from 20·6 to 27, but the mortality fell from 8·1 to 6·7 per cent. There was a decline in the deaths from phthisis.

Central Provinces.

113. All lunatics are now in one asylum at Nagpur. The very high mortality was made the subject of a special enquiry, which is still in progress. The cause is ankylostomiasis and other affections caused by worms. The utmost sanitary precautions have been taken, and there is an improvement in the death rate in consequence.

Bombay.

114. The general health was satisfactory; the death rate was excessive in Naupada, and this is ascribed partly to its being an insanitary asylum. There were no epidemics.

The difficulty of obtaining an efficient staff of warders at the present rates of pay is acute; and the Surgeon-General with the Government of Bombay considers the question of their pay and prospects should be taken up at once.

Madras.

115. General health was satisfactory, but an outbreak of cholera occurred in Madras; and 12 died out of 22 inmates attacked. Hospitals for females were completed at Calicut and Vizagapatam. There is need for more accommodation.

D.—Medical Colleges and Schools.

Bengal.

116. *Medical College, Calcutta.*—The fourth block is nearly ready, and will give increased accommodation. The provision of separate Biological and Physical laboratories and a pharmacy room are under consideration. Attendance at the College continues to increase; there were 380 applications for admission against 293 last year; of these 123 joined. The number of male students, other than military, was 600, and of female 17. The military class numbered 107. 78 pupil nurses were trained, and the "dhai" class consisted of 31 women.

130 students appeared for the final L.M.S. and 18 for the M.B., of these 53 and 7, respectively, passed.

The total expenditure was £19,000, and receipts from fees amounted to £3,530. The staff of the College cost £12,058.

Medical Schools.—Attendance at the Campbell School was about the same as last year, at Cuttack there was a slight decrease and at Patna a slight increase. Altogether there were 507 male and 28 female students as compared with 495 and 26 last year. 43 students passed the final diploma examination, and 110 became qualified compounders.

The total cost of the three schools was £9,162, of which the establishment accounted for £4,864.

117. *Medical Schools.*—The students at the two schools at Dacca and Dibrugarh numbered 295 against 319 last year. The military classes consist of 40 students. 72 passed the final diploma examination, and 35 obtained compounders certificates.

Eastern Bengal and Assam.

The total expenditure amounted to £4,616 and £441 were received as fees. The stipends of female patients were raised from Rs. 7 to Rs. 10 per month. The cost of educating a pupil is Rs. 216 per annum at Dibrugarh, and Rs 192 at Dacca.

118. *Agra Medical School.*—The number of students fell from 329 to 301, of whom 66 were females. Fewer applications for admission were received. This decline is due to the Entrance certificate having been made compulsory. 60 pupils went up for the final examination and 39 passed. The Medical College at Lucknow is nearly completed and will be opened for junior classes in October 1911.

United Provinces.

119. *Lahore Medical College and School.*—The numbers of students on the rolls were 167 and 263 respectively, as against 175 and 207 last year. The reduction in College admissions is due to the higher preliminary standard required, and the increase in the school is ascribed to the date of admission being more popular. 71 students went up for the final M. B. or L. M. S. examinations and 26 passed, and 50 went up for the final school examination and 41 passed.

Punjab.

The total expenditure was £13,116, and the fees received amounted to £875. The complete rebuilding of the College will shortly be commenced.

120. *Government Medical School, Rangoon.*—The number of students on the rolls was 43, of whom 10 passed their final examination and entered Government service.

Burma.

Expenditure was £1,572, and fees amounted to £8. The school is still in its infancy, and the improvement in pay and prospects of the sub-assistant surgeon class may improve its popularity and the quality of its students.

121. *Medical College.*—There were 388 students on the rolls; but this number, though a reduction on last year's figure, is still too large for the existing accommodation. 23 pupils went up for the Final L. M. S. and 13 passed, 22 for the Final M. B. and two passed.

Madras.

Post collegiate classes were held for civil sub-assistant surgeons.

The new Physiology and Hygiene Laboratories have been completed, but the general improvement and enlargement of the college buildings are still urgently necessary.

Total expenditure amounted to £12,840, of which sum establishment charges represented £11,212. Fees brought in £2,170.

Royapuram Medical School.—The year closed with 177 pupils; 19 went up for the final examination and 14 passed. The total expenditure was £1,881, of which sum £170 were recovered as fees. The rent of quarters in the hostel has been reduced to Rs. 2 per mensem, but residence there has been made compulsory in the case of stipendiary students.

Tanjore Prince of Wales' School.—The number of students has risen to 94; seven went up for the final examination and six were successful. The school cost £780 of which £ 11 were recovered as fees.

Vizagapatam.—The school consists of only 52 students; of these four went up for the final examination, and all were successful. A new school building has been provided, and it is believed the popularity of the institution is increasing. Expenditure amounted to £1,091 and fees brought in £20.

122. *Grant Medical College.*—The number of students is 519, exclusive of 45 military pupils. There are 29 female students; 167 went up for the Final L. M. S. and 55 passed. The new lecture theatre, a hostel and pathological laboratory have been brought into use, and a physiological laboratory is under construction. Four additional lectureships have been created.

Bombay.

B. J. Medical School, Poona.—The number of students was 136, of whom 56 were military, 23 passed the final qualifying examination. Great difficulty is experienced in obtaining suitable candidates for the military class.

B. J. Medical, School, Ahmedabad.—The number of pupils was 139, of whom 55 were military, 22 passed the final examination. The new hostel accommodates 45 students, and is now full.

Medical School, Hyderabad.—The number of pupils was 51; at the final examination 8 passed. A new dissecting room has been provided, and a maternity ward in the civil hospital is now available for purposes of instruction.

The X-Ray institute of India.

123. Two classes of instruction have been held during the year, numbering 37 students in all. Of this number 33 passed the prescribed examination, 4 obtaining special proficiency certificates, and 4 failed to pass. The students included officers of both services (Civil and Military) assistant surgeons and sub-assistant surgeons (Civil and Military) as well as one assistant surgeon and one sub-assistant surgeon from Native States. The number of skiagraphic examinations made at the institute was 1,121, the electrolytic and mercurial interrupters with direct running from the mains being ordinarily employed.

Numbers of cases of disease sent for treatment during the year was 65.

Numerous experiments have been carried out with a view to keeping the service sets fully up to date; and recommendations based upon these experiments have been made to Government for the adoption of certain minor modifications and improvements, the principle of which is the replacement of the now obsolete dry cell by a small portable oil engine and dynamo.

Apparatus was lent by the institute to the Military authorities to enable them to carry out their earliest experiments with wireless telegraphy plant in the field.

A complete exhibit of x-ray apparatus and electrical apparatus for therapeutic purposes has been lent to the United Provinces Exhibition at Allahabad.

The scheme for increased accommodation and staff to enable the institute to undertake repairs of civil institutions, has received the approval of Government, and the work is to be put in hand early in the coming financial year.

No case of x-ray traumatism has occurred to any of the staff, students or patients of the institute.

SECTION VII.

SANITARY WORKS.

Bengal.

124. Excluding Calcutta, and including the two new municipalities of Dhulian and Madhupur, there were 130 municipalities in Bengal during 1909-10, as compared with 128 in the previous year. As, however, no statistics are available for the new Madhupur municipality, the figures below refer to only 129 municipalities. Including an opening balance of Rs. 15,80,011, their total income amounted to Rs. 80,82,914, of which 40 per cent. was spent on original and recurring sanitary works, 6·96 per cent. on roads, 4·35 on the public safety and 25·57 on all other requirements, the corresponding figures for 1908-09 having been 39·67, 8·19, 4·29 and 26·55, respectively. The total expenditure on sanitary works amounted to Rs. 37,97,012 or 46·98 per cent. of income, as compared with an expenditure of Rs. 35,29,695 or 47·87 per cent. of income in the previous year. About 14½ lakhs were spent on conservancy, nearly 5½ lakhs on drainage, over 5 lakhs on water-supply and over 6 lakhs under the heading "treatment of the sick". Compared with the previous year Rs. 26,795 more was spent on conservancy, Rs. 1,79,788 more on drainage, Rs. 84,191 more on water-supply and Rs. 44,411 more on the treatment of the sick. The increased expenditure on conservancy was due chiefly to larger outlay in the Darjeeling Municipality in connexion with the sewage scheme, while that on drainage was due to the construction of masonry drains in some of the municipalities in the Presidency Division and in the towns of Howrah, Arrah and Puri. The increased expenditure on water-supply was chiefly in connexion with the Monghyr water-works. The whole of the annual grant of Rs. 4,50,000 sanctioned in 1910-11 for expenditure on sanitary improvements was allotted during the year, the greater part of the money being apportioned among the following municipalities for water-works and drainage: Serampore (Rs. 20,000 water-works), Hooghly-Chinsurah (Rs. 70,000 water-works), Bagjola (drainage Rs. 56,000), Puri (drainage Rs. 15,000), Berhampore (drainage Rs. 16,000), Darjeeling (drainage Rs. 30,000), Ranaghat (drainage Rs. 19,000). The District Board, 24-Parganas, received a lakh of rupees for the improvement of the drainage of the Nawi and Sunthi rivers, and Rs. 20,526 were allotted for the dredging of the Bhagirathi. The total cost of various new works carried out by municipalities, District Boards, Government and private individuals amounted to Rs. 11,88,448, compared with Rs. 12,95,431 in the preceding year. The most important of these were the construction of masonry drains in the towns of Howrah, Tittaghur, Arrah, Puri, Bhatpara, Garulia, Khulna, Baranagore and Barasat at an aggregate cost of nearly 3½ lakhs of rupees.

Sanitary Board.

125. The constitution of the Sanitary Board remained unchanged, and, as in former years, the bulk of its work was done by circulating papers and notes among the members. Only one meeting was actually held at which the Ranaghat surface drainage scheme and the improvement of the Howrah filtered water-supply were discussed. In the promotion of water-supply schemes there has been considerable activity during the year. Various costly schemes are still in the initial stage, but a number of new works, notably those at Darjeeling, Monghyr, Naihati, Jessore, Gaya, Serampore, Hooghly-Chinsura, Howrah and Khulna had been completed or were under construction or had reached the stage of calling for tenders for the contracts. The most important drainage scheme for which preliminary estimates were prepared in the Sanitary Engineer's office during the year was for the complete main drainage of Gaya. The objects of the scheme are to intercept all the sullage and polluting matter now discharged in the river Phalgoo, and to carry it to a point about a mile below the town where the sewage will be passed over an irrigation area before reaching the river. The scheme is a combination of partial sewerage with a surface water drainage scheme, and is estimated to cost Rs. 6,80,000. The preliminary estimates of various other drainage schemes were under preparation and some of those completed in previous years were revised, notably those of Bankura, Kalna, Katwa,

Suri, Ranaghat and Bettiah. There are nine drainage schemes at present in course of construction, the most important of which are those at Howrah, Puri, Arrah and Daltonganj.

Although the capital expenditure incurred during the year on sanitary engineering works was comparatively small, greater progress has been made towards construction of works of this nature than in any year since the Sanitary Board was formed. This applies particularly to the important matter of water supply schemes, and it is hoped that during the course of the next two years the supply of filtered water will be greatly increased.

Eastern Bengal and Assam.

126. By the conversion of Shillong Station into a municipality, there are now 46 municipalities, one station and four unions in Eastern Bengal and Assam. The total income of the 51 institutions aggregated Rs. 20,77,795 or Rs. 52,896 less than in 1909. The expenditure on direct sanitation, which excludes Rs. 2,26,933 spent on the construction and maintenance of roads, was Rs. 11,20,194 or 53·91 per cent. of the total income, against 50·48 in the previous year. The efforts of local bodies were mainly directed towards the improvement of water supplies, and under this head Rs. 4,40,434, or nearly a lakh of rupees more than in 1909 and 39·32 per cent. of the total expenditure on direct sanitation during 1910 was incurred. The differences under the other heads of expenditure on sanitary measures are either small or do not call for comment on other grounds.

Sanitary Board.

127. The constitution of the Board was the same as in former years and three meetings were held during 1910. A sum of Rs. 80,000 was placed at the disposal of the Board by the Local Government to be distributed as grants-in-aid to the various District and Local Boards for the improvement of water-supplies in rural areas. Of this sum, Rs. 73,991 were allotted and in the majority of cases the Local Board and the people of the locality each contributed a sum equivalent to the grant, so that about two lakhs of rupees must have been spent in the province during the year on this useful reform. The scheme was introduced during 1906-07, when the grant-in-aid amounted to only Rs. 17,500, and steady progress has been made.

Many important water supply schemes were discussed during 1909-10 and those at Barisal, Munshiganj, and Haflong were commenced. At Chittagong a preliminary scheme has been drawn up to supply the town with water from three deep borings at an estimated cost of 4 lakhs of rupees. The present supply of water is ample but it has a chalybeate taste. The remodelling of the water-supplies to the civil station and cantonments of Shillong is under revision. The delay in putting this work in hand is due mainly to the necessity of comparing the rates of flow of the various springs at the driest time of the year.

Drainage schemes are being drawn up for Comilla and Sylhet, and a combined scheme for water-supply and drainage of Silchar is under consideration.

United Provinces.

128. No details regarding Municipal or District Board income, or of the expenditure on sanitation are furnished in the provincial report, but about 41 per cent. of the total income of municipal towns in these provinces was spent on conservancy, plague prevention, water-supply and drainage.

Sanitary Board.

129. The Sanitary Board was reconstituted during the year, and now consists of six official members and three unofficial members. Its functions are, however, the same as before, namely to advise Divisional Commissioners on sanitary works projected by District and Municipal Boards, and to give administrative sanction to all such works towards the cost of which contributions are made by the Board from funds placed at its disposal by the local Government. For these purposes the Board met nine times during 1910. One of the most interesting questions discussed was the provision of funds for model houses for the poor, and a sum of Rs. 30,000 was set aside from the yearly Provincial grant of five lakhs for sanitary improvements. It was originally intended that the money should be devoted to the erection of such buildings on a standard design, but the Board were of opinion that an experiment on these lines was doomed to failure on financial grounds alone, and,

on its advice the local Government agreed to grants being made to selected municipalities for the purpose of providing sites laid out with lanes and roads properly drained and aligned and provided with a good water-supply. The experiment is being tried in the Allahabad, Lucknow and Ballia Municipalities, and the areas selected will be blocked out and sold on favourable terms to those wishing to build houses on rules to be framed by each municipality. In order that the houses may be within the means of the poor, buyers will be allowed to build them in their own way with cheap material and rough workmanship and the only conditions to which they would be subject are some of the most elementary sanitary rules as regards air, space, ventilation, drainage, pukka walls up to a certain height and rough country brick floors just sufficient to render them rat proof.

The Sanitary Board, from the same grant, allotted a sum of Rs. 90,000 for rural sanitation and Rs. 34,550 for improving the sanitation of some of the smaller towns in the province. Rs. 50,000 were allotted in connexion with the inquiry into the causes of malaria and the free distribution of quinine, and various other allotments made as grants-in-aid to the larger municipalities towards the more important sanitary works under construction and to smaller municipalities for drainage schemes, water-supplies, filling in tanks, etc. Practically the whole amount of five lakhs was distributed. They also considered some important water-works and drainage scheme, among the most noteworthy of which was a project for additions to the existing water-works at Lucknow at an estimated cost of Rs. 1,31,777, and a supplementary project for the drainage of Hathras municipality at a cost of Rs. 31,733.

130. No particulars are given in the provincial report regarding the income and expenditure on sanitation of the municipal towns or of the district boards, but the following extracts from the annual report of the Sanitary Engineer to the Punjab Government give details of the principal improvements effected :—

Punjab.

Lahore.—The work of constructing the water-supply reservoir on the mound of Ferozepore Road has been completed and new mains laid on the roads commanded by it. The Muzang, a large suburb of Lahore is now well supplied with water. New mains were also laid in some other small areas of the city and a new engine, pump and boiler ordered. Considerable alterations in the surface drainage of the civil station were carried out. Storm channels were regraded, and the city storm water escape was widened. The drains adjoining the Lohari Gate were remodelled to reduce the high flood level.

Amritsar.—Experiments have been carried out to find out the safe working head in the water-supply wells, and a test boring was made in the ground adjoining one of the existing wells, in connexion with the question of increase of the supply from the present wells. The result has been satisfactory, and it is confidently hoped that the sinking of a perforated tube in each well will amply meet the present demand. It is proposed to sink a perforated tube in one well and test the increased yield. Work on the sullage disposal works was put in hand and some progress made with it. The estimate had to be revised to cover the cost of supplying reinforced concrete floors in the collecting tanks and screen, rake, and detritus gear which were not provided for in the original sanctioned estimate, and also to cover probable excesses. The revised estimate was sanctioned for Rs. 1,08,828. A drain for the storm water of the compound of the Jubilee Hospital was constructed at a cost of Rs. 5,000. The city drainage work in the area of Lohgarh Gate (the estimated cost Rs. 39,300) was completed during the year.

Delhi.—The suburban drainage works (estimated cost Rs. 3,14,000) are still in hand and considerable progress has been made. A project for Rs. 25,000 has been worked out in detail for works in connexion with the reclamation of the municipal Bela. A further project for levelling of the Bela will be prepared after the site has been cleared and levels taken.

Multan.—Drainage works in the Town Hall and suburbs have been completed at a cost of Rs. 19,600.

The question of the regular pipe water-supply for the city of Multan has received the attention of the municipal committee. Estimates which were prepared

some years ago and had to be withheld until the completion of drainage works are under the consideration of the Sanitary Engineer.

Sialkot.—The municipal committee is arranging to have its own regular pipe water-supply independent of the cantonment. Experimental borings have been carried out, the site of head works fixed, and the number of wells required determined.

Gujrat.—Work on the intra-mural drainage scheme sanctioned for Rs. 36,994 in 1909 is in progress.

Dharmsala.—The extension of the water-supply in the new civil station in Lower Dharmsala which was sanctioned in 1909 at an estimated cost of Rs. 20,688 was practically completed during the year with a saving of Rs. 4,000 on the sanctioned estimate. The scheme has worked satisfactorily so far and is ample for the present requirements. The question of combined water-supply for the municipality and the Cantonment at Upper Dharmsala was thoroughly gone into on the spot by the Sanitary Commissioner and Sanitary Engineer. A detailed project estimated to cost Rs. 26,312 was prepared and submitted. The Sanitary Board has sanctioned a grant-in-aid of Rs. 10,000.

Ambala.—The experiments of sinking tubes in the wells at Handesara water-supply head works are still in hand and are progressing favourably. It now seems certain that the requisite increase in supply of water will be obtainable by this means. In all 11 important sanitary works were completed during the year under report at a cost of Rs. 3,32,000. Six estimates aggregating Rs. 1,29,000 were sanctioned by the Local Government in the Public Works Department. The estimates which were scrutinized and approved by Sanitary Engineer are 36 in number, their amount being Rs. 6,93,000 (round).

Sanitary Board.

131. The constitution of the Sanitary Board was the same as last year, except that the second, instead of the first, Financial Commissioner was appointed President. The Board met five times for the consideration of the various schemes submitted to them, the most important of which was the extension of sewage mains at Simla. It is estimated to cost Rs. 61,013.

North-West Frontier Province.

132. There has been no large expenditure on any special sanitary work, but a great deal of money has been laid out on various minor schemes. The Peshawar Municipality has spent Rs. 21,000 on improving its water supply, Rs. 13,500 on roads and bridges and Rs. 12,000 on drainage. The Dera Ismail Khan Municipality has in the same way spent Rs. 16,000. Of this a sum of Rs. 2,800 was spent on paving streets. The Kohat Municipality spent Rs. 3,000 odd and the Bannu Municipality Rs. 5,000. The town of Dera Ismail Khan is attempting to incinerate the whole of the town refuse by means of Rait's incinerators of which a good many have also been purchased for Peshawar city.

Central Provinces and Berar.

133. No details regarding municipal funds or of the proportion of income devoted to sanitary works are contained in the provincial report. The Gorewara tank water-supply scheme has been in progress throughout the year, and the expenditure incurred during 1910 on this scheme was no less than Rs. 3,45,420. The construction of the dam, tunnel, outlet, valve tower pumping station and service reservoir have been almost completed: the wasteweir rock cutting is in progress, half the catchment area has been acquired and fencing is being done. The Harda water-works have been completed and distribution pipes were being laid, the expenditure incurred during the year amounting to Rs. 1,12,068. At Burhanpur the construction of galleries over the water channels was proceeding, and it is expected that the work will be completed next year.

Schemes of surface drainage for various towns have been drawn up. For Jubbulpore a sewerage scheme is being got ready and seven incinerators have been erected in the town. In Chhindwara, latrines of a new pattern are being erected and in Seoni the earthenware mains were replaced by iron ones and the *bund* of the Babaria tank, which supplied water to the town, has been raised. In Nagpur, new roads were constructed at a cost of Rs. 40,000 and new markets costing Rs. 38,000 erected. In Hoshangabad also, some congested areas have been opened up and new

roads constructed. The Provincial Sanitary Commissioner reports that in the other municipalities, nothing worth recording was done. In most of the towns, drainage is very defective and water supply arrangements are badly needed, but the appointment of a Sanitary Engineer for these Provinces has recently been sanctioned.

Madras.

134. No details regarding municipal or district board income, or of the expenditure on sanitation are furnished in the provincial report. Conditions as to water supply in the mofussal municipalities remained the same as last year, no new works having been opened for public use during the year. Schemes are however under execution in Berhampur, Salem, Kodaikanal, Periyakulam and Vizianagram. The sanitary improvements effected during the year consisted of, construction and repairs of wells, markets, slaughter houses, drains and latrines. A drainage scheme for Ootacamund is under construction, the cost of which is estimated at Rs. 4,21,007.

The Madras City drainage scheme made very slow progress during the year.

Sanitary Board.

135. The constitution of the Board was the same as last year, but the Secretaryship was transferred from the Registrar of the Public Works Department Secretariat to the Deputy Chief Engineer, Public Works Department. Its functions remain purely advisory. The Board reviewed a large number of schemes, the aggregate cost of which was Rs. 25,94,436; of these 22 schemes costing Rs. 23,67,105 were for municipalities and 36, costing Rs. 1,96,531 were for local fund boards. These figures show some diminution as compared with 1909, but the reason may be largely attributed to the fact that the Board's approval is now only required to schemes costing Rs. 2,500 and over, instead of Rs. 1,000 as heretofore. The raising of the limit should result in the smaller works being more expeditiously handled by local bodies and to great relief in the routine work of the Board. The two most important schemes examined were the Tondiarpet drainage and other works connected with the Madras improvement scheme, Rs. 15,65,100; and the Negapatam water supply scheme, Rs. 6,57,680.

Bombay.

136. The municipality of Bhadgaon was abolished and Malad and Borivli created "notified areas", so that, excluding the City of Bombay, there were the same number of municipalities in the Presidency during 1909-10, as in the previous year, namely 157. Their aggregate income amounted to Rs. 92,02,824, compared with Rs. 81,51,611 in 1908-09, and the amount expended on public health improvements during 1909-10 was Rs. 25,18,218, compared with Rs. 19,00,738 in the previous year. Many improvements in water supply and drainage are being carried out, the most noticeable of which are the following. At Ahmedabad, a loan of 3½ lakhs of rupees has been raised for extending the head works and laying pipes of larger diameter. The work has been commenced and Rs. 8,075 expended during the year. The infiltration wells and the main connecting them with the jack well at Pandharpur, which was referred to in the report for 1909, were completed during the year. The distribution system was completed, the pumping machinery erected and considerable progress made in the construction of the engine and boiler house. The expenditure incurred during the year was over 2½ lakhs of rupees. There has been some delay in completing the water supply scheme at Nasik, but over a lakh of rupees was spent and work is well advanced. At Sholapur, estimates amounting to Rs. 3,16,427 for improvements to the existing water supply were sanctioned, and work will be taken in hand as soon as the orders of Government are received on the municipality's application for a loan of 3 lakhs of rupees. At Dharwar, Rs. 1,87,350 were spent in the impounding reservoir and machinery and the work completed. Sanction has been accorded to the Karachi Municipality to raise a loan of Rs. 8,10,000 for the improvement of its water supply. The important drainage works in this town were continued and an expenditure of Rs. 1,21,083 on this account was incurred during the year. A new air compressor had to be erected to meet the demand for air caused by the extension of the drainage system and the consequent increase of the sewage discharge from ¾ to 1¼ million gallons a day, and one capable of compressing 1,000 cubic feet per minute was purchased at a cost of Rs. 36,000 and is working excellently. In addition to the Government of India grant of 7 lakhs for sanitary improvements in the Presidency, the local Government gave sums aggregating Rs. 59,893 to several municipalities exclusively for the improvement of village water supply.

137. The Sanitary Board held only two meetings during the year, when among other matters proposals were considered for improvements in the Igatpuri water-supply, sewage disposal of the head quarters police lines at Bhamburda, revised schemes for water supply and drainage at Poona, drainage for the town of Nasik and a scheme for the drainage and water supply of Thana.

Sanitary Board.

138. The total disbursement for the province on sanitary works during the year was Rs. 45,64,279, which represented 31·98 per cent. of the income. Of this amount Rs. 12,60,177 or 8·83 per cent. was expended on water-supply, Rs 5,44,549 or 3·82 per cent. on drainage, Rs. 13,15,449 or 9·22 per cent. on conservancy and Rs. 14,44,104 or 10·12 per cent. on other sanitary works. The corresponding amounts in 1909 were as follows: Rs. 47,35,188; Rs. 16,19,907; Rs. 6,15,711; Rs. 13,11,884 and Rs. 11,87,686. Of the total expenditure during 1910 45·70 per cent. was obtained from municipal funds and 26·83 from funds of non-municipal towns. The balance was apparently provided by Government.

Burma.

The main trend of sanitary works, other than large water supply and drainage schemes, carried out during the year was towards reclaiming water logged areas, increasing the number of tube and Abyssinian wells and increasing the number of tanks with a protected drainage area in villages and the smaller towns. Many new and important projects were drawn up by the Sanitary Engineer during the year, among which may be mentioned gravitation water supply schemes for Pegu estimated to cost Rs. 3,16,833, Mandalay (Rs. 12,94,804) and Yamethin (Rs. 91,793), and drainage schemes for Moulmein and Syriam estimated to cost Rs. 65,533 and Rs. 56,476 respectively.

139. The Sanitary Board met only once during the year when approval was given to the Kyaiklat water supply scheme and details were decided for the laying out of the site of the proposed new railway town of Gamonseik. The Kyaukpadaung water supply scheme was also discussed at the meeting and objections raised to it mainly because it provides for the use of buckets which are liable to contamination. The project has been returned for further consideration on this point and for an analysis of the water.

Sanitary Board.

140. During the year 1910-11 the expenditure on ordinary Military Works was Rs. 89,27,929, compared with Rs. 83,10,027 during the preceding year and on special Military Works Rs. 30,32,060 compared with Rs. 28,47,192.

Military Works.

Details regarding new works and improvements in some of the more unhealthy cantonments will be found in the statements appended to tables V and XXX at the end of the volume.

SECTION VIII.

GENERAL REMARKS.

Laboratories.

141. The staff of the *Central Research Institute*, Kasauli, conducted investigations during the year into (*a*) Epidemic Dropsy in Calcutta, (*b*) some aspects of Malaria in the Punjab, (*c*) the relation of Tetanus to hypodermic and intramuscular injection of Quinine, (*d*) a new method of anti-rabic treatment by means of dead rabies virus, (*e*) Kala azar at Golaghat, and (*f*) Dysentery at Hazaribagh. Reports of the results of the first four of these investigations have been published as numbers of the Scientific Memoirs. Reports on Kala azar and Dysentery are under preparation.

Short courses of instruction in clinical bacteriology and technique were given at the Institute and were attended by 23 officers of the Indian Medical Service. The course includes instruction in the practical application of bacteriological knowledge to the conditions in which diseases are met with in India, and methods of improvising small laboratories for clinical bacteriological work in the plains. In December 1910 eight officers of the Royal Army Medical Corps attended a course of instruction which included, in particular, the technique of the Wasserman test for syphilis.

The demand for curative sera and vaccines continued to increase, and during the year the Institute complied with indents to the following extent :—

Anti-venomous serum	2,836	doses.
Anti-diphtheritic serum	1,483	„
Anti-tetanic serum	1,054	„
Anti-streptococcic serum	447	„
Anti-dysenteric serum	48	„
Normal Horse serum	30	„
Anti-typhoid vaccine	1,964	„
Anti-tubercle vaccine	3,972	„
Anti-staphylococcus vaccine	1,083	„
Acne vaccine	228	„
Special autogenous vaccines	450	cases.
Tuberculin solutions for cutaneous test	447	tests.

Of the above, anti-tetanic and anti-streptococcic sera are obtained from England and stocked for issue. The total sum realized on account of sera and vaccines issued from the Institute during the year amounted to Rs. 25,668-9-0.

The other work carried out by the Institute included the examination of 2,637 specimens of a miscellaneous collection of pathogenic material with a diagnosis in each case.

The *Bombay Bacteriological Laboratory* continued to be conducted as (*a*) the Plague Laboratory for the whole of India, and (*b*) the provincial Bacteriological Laboratory. During the year 625,690 doses of anti-plague vaccine were issued, an increase of 32,526 doses on the output of the previous year. It is evident that confidence in this method of combating plague is slowly but steadily growing. The total amount of money credited to Government during the year, as the result of the sale of the plague prophylactic was Rs. 45,059-2-11. In the report of last year it was pointed out that the surest proof of the efficacy of inoculation was afforded by the continued immunity of the Laboratory staff, who in connection with their daily work are constantly in contact with plague-infected rats and fleas. Yet the staff, numbering 116 persons, who are regularly inoculated every year, escape infection. Comparative figures of plague incidence and

mortality amongst the treated and untreated are cited for various towns, and afford ample evidence in favour of the measure.

An investigation of the fecundity of *mus rattus* showed that a single pair might produce over 800 young in 16 months. A series of experiments was carried out in connection with an outbreak of plague amongst a nomadic race of fishermen and wild fowlers in Seistan, which showed that rat fleas are not carried by ducks. An investigation on the pulicidal power of the sun showed that the factor which is chiefly operative is heat. A simple expedient for flea destruction is thus available. It is necessary only to spread flea-infested clothing on a sandy place which has been warmed by the sun, and to leave it there for the space of an hour. The results of this investigation have been published as No. 40 of the Scientific Memoirs.

On behalf of the Health Officer, Bombay City, 119,456 rats were subjected to *post mortem* examination, and 11,493 were found to be plague infected. A considerable number of medical men received instruction in the examination of rats, and the diagnosis of plague in them. Many were also shown the methods employed for the manufacture of anti-plague vaccine, and others instructed in the technique of inoculation work.

There was an increase in the work done by the Laboratory as the provincial Institution: 1,257 pathological fluids, 263 tumours and other tissues, and 84 brains of dogs dying of symptoms suspicious of Rabies were examined. During the year 105 snakes were received for the extraction of venom, and experiments were carried out to test the value of certain reputed antidotes of a chemical nature for the venoms of Cobra and Russell's Viper, which however were proved to be useless.

In research work an improved method of employing the Hecht-Fleming complement deviation reaction was worked out by Captain W. D. H. Stevenson, I.M.S., and important results were obtained from the examination of the sera of syphilitics and lepers by this method.

Captain T. S. B. Williams, I.M.S., continued his investigations on the Bacteriology and Treatment of Leprosy, the results of which have been published as No. 42 of the Scientific Memoirs. Experiments on animals in the treatment of snake-bite—Russell's Viper, and the Cobra—showed that the immediate local application of potassium permanganate, after free incision did not prevent death. A large amount of work was done in connection with vaccine-therapy. Many interesting cases have been examined and treated in the Bombay hospitals. During the year, 243 autogenous vaccines have been prepared for special cases, in addition to stock vaccines of various kinds. Therapeutic sera from the Lister Institute are stored for sale.

The report of the Micro-Biological Section of the *King Institute of Preventive Medicine* shows a considerable increase in the amount of work performed. In the period under review the systematic examination of the water-supplies of the Presidency was continued, each supply being examined once a quarter. The water supplies of jails in the Presidency were examined half-yearly. The amount of pathological and other material sent for examination continued to increase, and during the year 3,397 specimens were received.

An investigation as to the presence of the organism of syphilis in still-born fœtuses of a particular type, which are extruded in a macerated condition, was commenced. In 10 out of 40 of these the spirochaeta pallida was demonstrated.

The usual courses in Minor Sanitary Engineering and in Vaccination were held during the year, and were attended by 43 and 30 students, respectively.

The work of the Vaccine Section of the Institute has been noticed in Section V of this report.

At the *Pasteur Institute, Kasauli*, the number of patients afforded anti-rabic treatment during 1910 was 2,073, an increase of 136 on the number of the previous year. The total number of patients excludes 328 individuals who applied for advice but whom it was considered unnecessary to treat. Of the total, 354 were Europeans, and 1,719 were natives, compared with 500 and 1,437, respectively, in the previous year. From the British Army there were 136 patients, and from the Native Army (including British officers, their wives and children) 157, whilst European civilians numbered 165, and Native civilians 1,615.

There were 26 deaths from hydrophobia among those treated, giving a mortality of 1·25 per cent., but excluding those who died during treatment or within 15 days of its completion, the number of failures falls to 4 only, giving a ratio of 0·19 per cent., which is the lowest annual rate since the Institute was opened. The experience of the Institute as regards anti-rabic treatment over a period of ten years is reviewed, and many interesting statistical results on the association between degree of wounding, number of wounds, interposition of clothing, cauterisation, *et cetera*, and liability to infection are given.

The work of the Institute as a provincial Bacteriological Laboratory included the examination of 1,438 specimens, of which 814 were from the Punjab.

At the *Pasteur Institute of Southern India, Conoor*, 827 persons were treated, compared with 658 in the previous year. Of the total 148 were Europeans, 73 Eurasians and 606 Natives. During the year there were 17 deaths, three of which occurred during treatment, 8 within 15 days of completion of treatment, and 6 more than 15 days after. The percentage of failure if deaths which occurred during treatment or within 15 days of its completion be omitted, was 0·72: but if a failure be reckoned for comparative purposes as a death occurring more than 33 days after the commencement of treatment, then the ratio is 0·36.

Investigations were carried out in connection with Rabies, and on the problem of immunity in general. These have been published in Bulletin No. III of the Institute.

Papers on the physical chemistry of immunity, and the mathematics of Epidemiology and Bacterial Bionomics have also been published.

142. *Plague.*—The Plague Research Commission continued their investigations into the etiology of plague, their head-quarters being at the Bombay Bacteriological Laboratory.

Special Enquiries.

An officer was detailed to enquire into the reasons why epidemics of bubonic plague were so rare in Eastern Bengal and Assam, while they flourished in Bihar. An examination of rats and fleas in certain selected places was made, and it was found that the average numbers of *M. rattus* per 100 traps set were in Dacca and Chittagong 10 and 10·5, respectively, whereas in Bhagulpur (Bihar) the ratio was 34·4. It was concluded therefore that the Province of Eastern Bengal and Assam has escaped plague mainly because rats are scarce in the houses, the reason of this being the construction and arrangement of the houses and their cleanness. An investigation was also instituted to enquire into the comparative freedom of Madras from plague. In the city it was found that *M. rattus* was abundantly present; that the susceptibility to plague of the Madras rat was much greater than that of the rats in Bombay at the present time; that the number of fleas per rat was little lower than it is in Bombay. The study of this perplexing problem has not yet been completed. In Bombay a series of *godown* experiments was carried out which showed that material epidemics of plague amongst rats can only occur when fleas are present and that the severity of such epidemics is proportional to the number of fleas. The survivors of many of these epizootics were tested as to their immunity to plague by comparing their resistance to subcutaneous infection with that of normal Bombay rats. It was found that the survivors were highly resistant, but not in a markedly greater proportion than could be accounted for by survival of the fittest. Observations on the immunity of Bombay rats led to further experiments, in which the relative immunities of rats obtained from places, which had suffered in various degrees from plague, were compared with that of Bombay. It was found that on subcutaneous inoculation the percentage of rats which succumbed to plague was 91 for Madras, 44 for Bombay, 57 for Bhagalpur and 26 for Poona. Experiments were then carried out to ascertain whether this immunity was acquired or inherited. Two classes of rats were used to settle this point, in the one instance those caught by traps in Bombay, and in the other those of a generation which had been bred from rats caught in Bombay. Of the former class 37·5 died, and of the latter 35·4. The Commission concludes that one effect of the plague epizootic is the establishment, by a process of natural selection, and survival of the fittest, of a more resistant race.

Leprosy.—In No. 42 of the Scientific Memoirs by officers of the Medical and Sanitary Departments of the Government of India, are detailed the researches of Major E. R. Röst, I.M.S., and Captain T. S. B. Williams, I.M.S., on the cultivation

of the Leprosy *bacillus*. It appears that the organisms cultivated, under widely different conditions, by these observers are in all probability identical. The ultimate result has been the production of an acidfast organism, which is a pleomorphic streptothrix and which has the power of producing a marked reaction in lepers.

Vaccines have been prepared from these organisms, and Major Röst describes in his paper very satisfactory results from their use. In Bombay vaccines are in use which were prepared at first from the streptothrix growth on milk, and later from the bacillary form of the organism grown from Röst's Medium. It is stated that the results of treatment of lepers by this method are most encouraging.

Malaria.—The transactions of the Committee for the study of malaria in India, during the last year have been published as Nos. 2 and 3 of PALUDISM. It is only possible for me to give a brief summary of the work which has been done.

I.—Work of the Central Committee.

Three courses of instruction have been held at Amritsar, from 15th March to 30th April 1910, from 15th October to 26th November 1910, and from 15th March to 30th April 1911. The last was attended by three officers of the Royal Army Medical Corps, four of the Indian Medical Service, two Military Assistant Surgeons, six Civil Assistant Surgeons, two Sub-Assistant Surgeons and a Medical Officer of Health from the Mysore State.

The collection of Indian anopheles at the Central Malaria Bureau is practically complete, and many specimens of Culicidæ and of larva-eating fish have been received.

II.—Measures undertaken in the several Provinces.

Madras.—A Malaria Board is to be constituted and a special malaria officer is to be deputed for three years. Another officer, Major Perry, I.M.S., has been deputed under the instructions of the Central Committee to investigate the malarial circumstances of the Jeypore Agency in this Presidency. In some parts of the area of investigation malaria is very severely prevalent and in others only very moderately so, and it is hoped that important practical results in connection with the best methods of preventing malaria will accrue if the causes of the variations of malarial intensity can be ascertained. In 1910 the practical anti-malarial measures carried out in the Presidency included the introduction of effective drainage in different places, the filling up of useless ponds and pits, the prohibition of wet cultivation in proximity to dwellings, the destruction of mosquito larvæ by petrolage and the free distribution of quinine in malarious areas.

Bombay.—The Sanitary Board has been appointed the Provincial Committee for dealing with malaria. One of the Deputy Sanitary Commissioners, Major Hutchinson, I.M.S., attended the first malaria class at Amritsar, and on his return arrangements were made for the collection and compilation of mortality statistics on the lines recommended by the Central Committee. For the investigation of malaria in Bombay City, Dr. C. A. Bentley was on special duty from 1909 to 1911, and his valuable final report has been published. It indicates that in Bombay carefully devised measures for the destruction of the dangerous species of anopheles mosquito would very probably result in complete eradication of malaria from the city. The other anti-malarial measures carried out in this Presidency during 1910 included the deputation of 27 sub-assistant surgeons to carry out operations for the mitigation of malaria in certain selected districts.

Bengal.—The Sanitary Board is the Provincial Committee for dealing with malaria. A specially trained officer, Captain Fry, I.M.S., has been appointed for malaria research in the province, and has been provided with a staff of assistants which will be increased as necessity arises. The anti-malarial measures carried out in 1910, included minor measures of draining and petrolage in several towns and the construction of permanent masonry surface-drains. For the free distribution of quinine in affected districts, 23 sub-assistant surgeons were deputed. A proposal from the Local Government for a special engineering establishment for drainage schemes is under consideration.

United Provinces.—Major J. C. Robertson, I.M.S., was placed on special duty for malaria research in November 1908, and during the remainder of that year and the greater part of 1909 Captain J. D. Graham, I.M.S., was also engaged in that work. In March 1910 the latter officer was deputed to attend the malaria class at Amritsar, and in May he took over the duties of special malaria officer and has continued to perform them since. A provincial Committee and eight Divisional Committees have also been established in these provinces, and during 1910 various important enquiries into the malarial circumstances of towns and rural areas, as well as valuable educational and other measures for popularizing the use of quinine and making the drug available to the poor, were actively carried on. In four selected districts travelling dispensaries toured from village to village giving medical relief to persons suffering from malaria and other diseases.

Punjab.—An influential provincial Committee for dealing with malaria has been appointed and a specially trained officer, Lieutenant-Colonel J. R. Adie, I.M.S., with an adequate staff has been deputed as chief malaria officer. During recent years large quantities of quinine have been distributed gratuitously by various agencies. Early in 1909, Major Christophers, I.M.S., was placed on special duty to investigate the causes of the terrible epidemics of malaria which from time to time affect this province. His report has been published as No. 46 of the Scientific Memoirs. It shows that periodical flooding is an important factor in the causation of epidemics of malaria in this Province, and that the measures necessary for their prevention and control may quite possibly come within the range of practical politics. This matter is now under consideration.

Eastern Bengal and Assam.—In 1907 the Duars Planters' Association approached the Government of this province with a memorial requesting that the services of experts should be procured to enquire into the nature and causes of Blackwater and other fevers and to suggest remedial measures. As a result, the Government of India ordered a special enquiry to be conducted by the Central Research Institute, assisted by an Advisory Committee. Major Christophers and Dr. Bentley were entrusted with the scientific portion of the investigations and their report upon Blackwater Fever, which was published in 1908, as No. 35 of the Scientific Memoirs, is almost universally regarded as settling finally the vexed questions with regard to the etiology of that dangerous disease. A large proportion of the planters in the Duars have taken action in accordance with the findings of the report and the result has been a great diminution in the number of cases of Blackwater Fever and a much reduced amount of malaria among them. The second report by the same officers on malaria in the Duars was written in 1909, and in view of the importance of the results recorded in it, the local Government in March 1910 appointed a committee to enquire into the sanitary and economic conditions under which the tea-garden coolies live. Both reports are about to be published and action upon them is being taken. In addition a very complete organisation for dealing with malaria in this province has been established. Among the anti-malarial measures adopted, in addition to organised attempts at mosquito reduction, is a new system for supplying quinine in a very effective and cheap form. The system is described in detail on page 93 of No. 2 of "PALUDISM". Six quinine demonstration camps will also be established and various important methods of educating the people in measures for the prevention of malaria form a noteworthy feature of the scheme in this province.

Burma.—A provincial malaria committee has been formed and Major Lalor, I.M.S., has been employed solely in malaria work.

Central Provinces.—The Sanitary Board is the provincial Committee and a specially trained officer, Major Kenrick, I.M.S., has been appointed special malaria officer. The investigations were commenced in October 1910, and some results of them will be found on page 98 of "PALUDISM" No. 2 and page 24 of No. 3.

III.—Special malarial investigations.

Saharanpur.—During the year 1909 Major J. C. Robertson, I.M.S., carried out an extensive investigation into the conditions prevailing in this city. The spleen and parasitic indices taken over the whole were 78·8 and 53·8, respectively. It was found that marginal areas were more highly affected than central ones; an observation of great value in connection with the spread of mosquitos into a free area, as the breeding places of carriers were found to encircle the city. In a report to the

local Government are given maps of the distribution of malaria according to spleen rate, according to mortality rate, and according to breeding places of carriers, and point at once to the conclusion that the chief cause of malaria in Saharanpur is irrigation which is beyond the capacity of the natural drainage of the place.

Major Robertson concludes by recommending modifications in the irrigation system, and the treatment of the infected by quinine.

Nagina.—Major Robertson also carried out a similar investigation in Nagina, United Provinces. The general spleen rate in this town was 79·1 per cent. Maps of spleen rate, and of malarial mortality rate showed as in Saharanpur the existence of an island of lower infection in the heart of the town and a map of breeding places of carriers shows their peripheral distribution. These are of the nature of tanks, a canal, and rice fields at the edges of the tanks. He recommends a progressive policy of filling up tanks, of substituting other crops for rice and at a later date that the canal which is at present close to the town should be deviated. And as in the case of Saharanpur he would treat the infected by quinine.

Three other towns in the United Provinces have been surveyed by Major Robertson and Captain Graham and reports are in course of publication. It is hoped that this progressive definite policy will be extended to other parts of India as it is primarily a policy which clears the way for action.

Bombay.—An investigation into the conditions affecting malaria in Bombay was commenced by Captain A. G. McKendrick, I.M.S., (with the advice of Sir Ronald Ross), in January 1909 and carried out from May 1909 until the end of 1910 by Dr. C. A. Bentley.

In this city the average spleen rate throughout the whole island was 7·2 per cent. This low figure is due to the fact that infection is limited to certain definite areas in the south of the island where the spleen rate rises to over 29·9 per cent.

These areas correspond to the breeding places of *N. Stephensi*, a mosquito which was proved to be the carrier in Bombay by Major W. Glen Liston, I.M.S., in 1908. In an exhaustive report by Dr. C. A. Bentley, all the factors affecting the prevalence and distribution of malaria are studied, and it is shown that the most dangerous permanent breeding places of the malaria carrier are the house wells in the Fort and in Dhobi Talao. Permanent measures taken as regards these, and temporary measures in the New Dock works would eradicate the evil.

Malaria in the Punjab.—In No. 46 of the Scientific Memoirs are published the results of an investigation carried out by Major S. R. Chirstophers during the year 1909.

In the exceptionally severe epidemic of 1908 it is shown that there existed two distinct major foci, one in the north affecting Gujrat, Gujranwala and Shahpur, and one in the south-east involving Gurgaon, Delhi, and parts of the Rohtak districts, which is continued into the United Provinces.

These foci are however not the same as those which were marked in previous epidemics; nor do they coincide with the areas of heaviest rainfall. It was found that when epidemic areas are examined in detail the villages are observed to have suffered almost exactly in proportion as they have been flooded. Floods act equally whether they are due to local rainfall, or to the indirect effects of rain causing the overflow of rivers. This explains why epidemic areas are not exactly coincident with the areas of heaviest rainfall, and why the former almost always overlaps the latter in the direction of the drainage.

Special surveys were carried out in some detail in Amritsar and Delhi, and some of the conditions prevailing in Bhera, Palwal, Miani and Gujrat were examined.

Amritsar.—The spleen rate was found to show a concentric gradation, varying from 14 per cent. in the centre to 75 per cent. in the periphery; and this was observed to correspond with the distribution of the breeding places of the carrying mosquitos. These were of the nature of large weedy tanks, and submerged waste land and fields.

Delhi.—Breeding places were found to occur chiefly in the bed of the Jumna, and in swampy parts of the Bela. The areas of malaria prevalence, and spleen of high

rate were for the most part in propinquity to the river. A complete survey was not made.

Palwal.—Is an example of a small town situated in a water-logged area. In an outlying quarter the spleen rate amongst 30 children examined was 97 per cent. and amongst 16 children in the central area it was 62 per cent. Over the whole town the spleen rate amongst 147 children examined was 88 per cent. In the epidemic of 1908 Palwal was surrounded by standing water.

Experiments were conducted with proteosoma on sparrows which show that severity of infection is largely dependent on the dose inoculated. This is not merely a matter of the number of infected mosquitos, but of the number of sporozoites injected at each bite. And this in turn depends upon the number of gametes in the blood of the original sparrow by which the mosquito was infected. The report also includes the calculation of correlation factors, and the author's figures show a high correlation between intensity of an epidemic, on the one hand, and rainfall, deficiency of rainfall in the previous year, and famine conditions which lessen the resistance of the individual against the disease.

The second *Malarial Conference* was held at Bombay on November 16th and 17th, 1911. The proceedings will be published in No. 4 of PALUDISM.

The following resolutions were passed:—

I. This Conference is of opinion that researches by experts in the field, such as those carried out by Christophers and Bentley, prove the value of preliminary scientific investigation; and seem to point to the probability that anti-mosquito measures may not prove so costly as was at one time feared.

II. The Conference believes that no one measure can be suitable for all the conditions that favour the prevalence of malaria; that quinine prophylaxis applied to a free population is difficult to carry out in the thorough way necessary for success; and that a combination of several measures may be required as local circumstances may indicate. The Conference is of opinion that notwithstanding the difficulties of quinine prophylaxis it cannot be too strongly emphasized that under the peculiar conditions of the Indian populace arrangements for the treatment of quinine of those sick from malaria is a matter of primary importance from the point of view of saving life, of preventing suffering, and of destroying a potent source of infection.

III. The Conference desires to call the attention of Government to the possibility of danger arising from borrow pits in the proximity to human habitations, especially when such excavation would result in stagnation of water therein.

IV. The Conference is of opinion that the education of the people is a most important anti-malarial measure and that every effort should be made to secure the co-operation of the public without which there is little hope that the campaign against malaria will ever be crowned with success. They believe that instruction in schools as well as lectures and lantern demonstrations in villages and towns are the best methods of propagandism and that in this way information is more likely to reach the people than by the publication of pamphlets and posters.

V. The Conference while strongly recommending the prosecution of further research is of opinion that although expert investigation is still necessary, enough is known as to the breeding habits of mosquitos, etc., to make it frequently possible for trained workers to deal with malaria in an efficient manner.

VI. In view of the possibility of the importation of Yellow Fever into India, the Conference suggests the advisability of a careful 'Stegomyia' survey and of the education of the public in the matter of destruction of domestic mosquitos.

143. Since the issue of the last report the following eleven numbers of the Scientific Memoirs have been published:—

Scientific publications.

No. 39. *The applicability to Medico-Legal practice in India of the Biochemical tests for the origin of blood stains*, by Lieutenant-Colonel W. D. Sutherland, M.B., I.M.S. No. 40. *The destruction of fleas by exposure to the sun*, by Captain J. Cunningham, M.D., I.M.S. No. 41. *Quinine and its salts, their solubility and absorbability*, by Captain A. C. MacGilchrist, M.A., M.D., I.M.S. No. 42. *The cultivation of the bacillus of leprosy and the treatment of cases by means of a vaccine prepared from the cultivations*, by Major E. R. Röst, I.M.S. No. 43. *The relation of tetanus to the hypodermic or intramuscular injection of quinine*, by Lieutenant-Colonel Sir D. Semple, Kt., M.D. No. 44. *The preparation of a safe and efficient anti-rabic vaccine*, by Lieutenant-Colonel Sir D. Semple, Kt., M.D. No. 45. *Epidemic Dropsy in Calcutta*, first report by Major E. D. W. Greig, M.D., I.M.S. No. 46. *Malaria in the Punjab*, by Major S. R. Christophers, M.B., I.M.S. No. 47. *Dysentery and Liver abscess in Bombay*, by Major E. D. W. Greig, M.D., I.M S., and Captain R. T. Wells, M.A., M.B., I.M.S. No. 48. *Investigation into the Jail Dietaries of the United Provinces*, by Major D. McCay, I.M.S. No. 49. *Epidemic Dropsy in Calcutta, Final Report*, by Major E. D. W. Greig, M.D., I.M.S.

Nos. 2 and 3 of *PALUDISM*, being the transactions of the Committee for the study of Malaria in India, have also been published.

STATISTICAL TABLES, 1910.

Table No.				Page.
I.—	European Troops.—	Summary.—	Sickness and Mortality by Geographical Groups.	76—77
II.—	„	„	Ratios of Armies	78
III.—	„	„	„ „ Geographical Groups	79
IV.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	80
V.—	„	„	Statistics of Officers.—Sickness and Mortality among Officers of British Army.	81
VI.—	Indian Troops.—	Summary.—	Sickness and Mortality by Geographical Groups.	82—83
VII.—	„	„	Ratios of Armies	84
VIII.—	„	„	„ „ Geographical Groups	85
IX.—	Prisoners.—	Summary.—	A.—Sickness and Mortality by Administrations.	86—87
	„	„	B.—Sickness and Mortality by Geographical Groups.	88—89
X.—	„	Ratios of Administrations	... ...	90
XI.—	„	„	„ Geographical Groups	91
XII.—	General Population.—	Provincial Birth and Death Statistics	...	92
XIII.—	„	„	Births	92
XIV.—	„	„	Deaths	93
XV.—	„	„	„ in Towns and Rural Circles compared ...	93
XVI.—	„	„	„ according to Age	94
XVII.—	„	„	„ „ „ Cause	94
XVIII.—	„	„	„ by months	95
XIX.—	„	„	Ratio of Deaths according to months ...	95
XX.—	„	„	Deaths from Cholera, by Provinces, 1879-1910	96
XXI.—	„	„	Deaths from Cholera, by months, in 1910 ...	97
XXII.—	„	„	Details of distribution and occurrence of Cholera in 1910.	97
XXIII.—	„	„	mortality from small-pox	98
XXIV.—	„	„	„ „ Fever	99
XXV.—	„	„	„ „ Dysentery and Diarrhœa ...	100
XXVI.—	„	„	„ „ Plague	101
XXVII.—	„	„	„ „ Respiratory Diseases ...	102
XXVIII.—	„	„	„ Vaccination	103

No. I.—*Summary, Sickness and*

Groups.	Years.	Average strength*.	Constantly sick.	Invaliddings.	Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1899-1908	1,162	65	27·3	12·6	·09	...	·09
	1909	1,311	51	6·9	...	...	...	...
	1910	1,317	30	14·4	12·1	...	...	...
Group II.—Burma Inland	1899-1908	2,010	69	27·7	3·9	...	1·3	·95
	1909	1,868	35	4·3	·5	...	...	·54
	1910	1,893	35	2·1	...	...	...	...
Group IV.—Bengal and Orissa	1899-1908	1,879	72	44·2	18·1	...	·8	·64
	1909	1,856	40	9·7	...	...	...	...
	1910	2,041	25	7·3	...	...	...	...
Group V.—Gangetic Plain and Chutia Nagpur	1899-1908	6,526	60	28·3	4·7	...	·7	·57
	1909	6,167	43	9·7	1·6	...	·2	...
	1910	6,269	34	9·1	·3	...	1·0	·48
Group VI.—Upper Sub-Himalaya	1899-1908	12,775	61	28·6	6·5	...	·6	·49
	1909	13,585	45	9·6	11·1	...	·1	...
	1910	13,775	32	7·3	1·7	...	...	...
Group VII.—North-Western Frontier, Indus Valley and North-Western Rajputana.	1899-1908	4,733	58	34·7	29·2	·02	·3	·34
	1909	5,027	46	47·5	83·3	...	...	...
	1910	5,064	34	7·1	19·2	...	...	...
Group VIII.—South-Eastern Rajputana, Central India and Gujarat.	1899-1908	5,832	67	35·3	5·5	...	·4	·33
	1909	5,950	44	11·8	·8	...	...	...
	1910	5,866	38	7·5	2·2	...	...	...
Group IX.—Deccan	1899-1908	9,797	61	26·4	6·5	·02	·8	·62
	1909	10,149	28	4·1	1·5	...	1·0	·59
	1910	10,679	29	6·9	·9	...	...	...
Group X.—Western Coast	1899-1908	1,546	57	24·1	2·1	...	·1	...
	1909	1,402	54	14·3	5·0	...	...	...
	1910	1,412	44	7·8	...	...	...	...
Group XI.—Southern India	1899-1908	3,353	61	24·5	2·7	...	·2	·12
	1909	3,612	49	11·9	·8	...	...	...
	1910	3,235	35	12·4	·3	...	...	...
Group XII (*a*).—Hill Stations	1899-1908	10,041	46	19·9	7·8	...	·3	·18
	1909	12,586	31	5·8	3·2	...	...	...
	1910	13,183	27	6·3	2·0	...	...	...
Group XII (*b*).—Hill Convalescent Depots and Sanitoria	1899-1908	3,459	70	41·1	4·5	...	·2	·12
	1909	4,186	69	13·6	·5	...	...	...
	1910	3,942	48	11·4	1·0	...	·8	·51
India	1899-1908	67,104	59	29·4	7·8	·01	·6	·45
	1909	71,556	40	9·1	9·2	...	·2	·10
	1910	72,491	32	7·8	2·7	...	·1	·10

* The decennial ratios are worked on the total strength of the ten year period.

Mortality by Geographical Groups.

RATIO PER MILLE OF STRENGTH.

A.—ADMISSIONS FROM

D.—DEATHS FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All Causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·7	...	3·4	1·03	141·4	·95	85·2	...	1·4	·26	32·4	2·24	323·0	·17	1,124·5	10·84
...	...	1·5	...	133·5	·76	254·8	...	2·3	...	19·8	...	147·2	...	881·0	6·10
·8	...	·8	...	9·9	...	81·2	...	...	...	6·8	...	72·9	...	372·1	6·07
·0	...	4·8	1·54	326·9	1·44	38·1	...	2·3	·50	14·6	·30	255·3	·30	1,141·6	10·05
...	...	·5	...	124·2	1·07	107·1	...	1·1	·54	8·6	...	96·9	...	756·4	6·42
...	...	1·1	·53	74·5	...	112·0	...	·5	...	6·9	...	78·7	...	655·6	2·64
·6	·05	6·5	1·54	300·2	1·17	51·9	...	4·3	·85	44·4	1·70	293·8	·11	1,182·3	16·60
2·2	·54	8·6	1·62	79·7	...	105·6	...	2·7	·54	16·2	...	100·8	...	643·3	7·00
...	...	1·0	...	51·0	...	72·5	...	1·0	·69	7·3	·49	64·7	...	388·5	6·86
1·3	·12	19·8	4·00	159·4	·23	62·3	...	2·8	·34	18·6	·69	198·7	·12	899·4	12·90
...	...	15·6	3·41	134·6	·32	140·7	...	2·8	·16	14·1	·16	81·7	...	739·6	7·13
...	...	6·2	·48	69·4	....	54·2	...	4·0	·32	6·9	·48	74·8	...	583·0	4·47
·5	·02	20·0	4·73	88·6	·62	33·3	·01	5·4	·75	13·6	·63	174·8	·12	1,024·5	12·98
·1	...	13·2	2·06	312·8	·52	76·0	...	4·1	·59	11·0	·52	62·6	...	869·2	6·92
...	...	5·2	·80	167·0	...	52·2	...	1·7	·22	6·7	·15	48·1	·07	618·1	5·23
1·1	·13	13·0	3·80	359·9	·46	60·4	·02	5·7	·57	8·7	·13	159·1	·06	1,105·0	11·22
...	...	10·7	2·78	367·4	·80	107·2	·20	3·6	·20	6·2	...	56·5	...	991·0	10·34
...	...	4·9	·39	334·3	·39	35·0	...	3·8	·59	4·3	...	47·0	...	913·1	4·54
1·5	·09	25·7	6·72	343·8	·45	24·1	·09	3·6	·45	19·2	·74	236·6	·12	1,130·7	15·55
·8	...	5·4	1·34	398·3	·34	29·2	...	1·8	...	9·7	·17	69·2	...	906·7	5·88
...	...	6·0	1·19	287·4	·51	15·0	...	2·4	·17	7·8	...	56·4	...	767·6	4·94
1·0	·05	19·8	4·25	167·7	·12	33·2	·01	2·9	·29	22·5	·55	249·3	·17	950·5	11·16
·5	...	12·5	2·17	105·8	...	18·1	...	2·7	·39	11·9	·10	63·3	...	488·6	5·12
...	...	6·7	·93	65·9	...	26·6	...	1·8	·19	13·0	·37	69·0	...	452·7	4·40
·6	...	3·2	1·62	160·7	·32	8·5	...	2·7	·65	11·9	·19	246·0	·26	819·4	9·96
...	...	7·	·71	217·5	1·43	29·2	...	2·1	·71	12·8	...	120·5	...	726·8	7·85
...	...	2·8	1·42	94·9	...	14·9	...	2·8	...	11·3	...	109·8	...	524·8	3·54
·5	·02	15·0	2·68	117·6	·18	33·0	...	2·2	·27	20·0	·24	255·0	·06	980·7	8·02
·9	...	7·2	·83	39·9	...	29·1	...	3·6	·28	22·1	...	95·5	...	675·8	6·09
·3	...	4·9	·31	67·7	·31	32·8	...	1·2	·31	10·8	·62	81·9	...	606·2	4·95
·2	...	15·2	2·81	98·9	·16	27·4	...	4·7	·69	10·8	·43	145·3	·18	725·3	7·94
...	...	4·4	·79	105·4	·24	27·3	...	2·1	·16	4·9	·32	52·0	·08	512·9	4·37
·1	...	2·5	·23	85·5	·08	16·2	...	1·2	·38	4·6	·30	48·1	...	460·4	3·41
·2	...	13·7	2·83	208·4	·46	13·4	·03	3·7	·49	16·1	·52	174·7	·40	983·9	11·45
·2	...	8·6	·72	197·3	·24	27·5	...	3·8	·48	11·9	·72	60·7	...	785·5	7·64
...	...	7·6	1·27	166·4	...	31·5	...	2·3	...	5·8	·25	51·2	...	680·1	6·85
·7	·05	16·5	3·40	220·3	·43	35·7	·01	4·1	·53	17·5	·59	201·0	·16	964·6	11·58
·3	·01	8·9	1·58	202·8	·36	61·3	·01	2·9	·31	11·2	·25	67·8	·01	716·9	6·25
·0	...	4·6	·63	132·0	·01	37·7	...	2·0	·25	7·7	·23	58·9	·01	576·5	4·66

No. II.—*Ratios of Armies, 1910.*

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	India.
I.—Strength	38,006	32,327	72,491
II.—*Constantly sick rate	32·8	33·0	31·9
III.—Invalidings	8·0	8·0	7·8
IV.—Admission rate of the year—			
Influenza	3·5	1·9	2·7
Cholera	·2	...	·1
Small-pox	...	·1	·0
Enteric Fever	5·0	4·5	4·6
Malaria	158·6	105·7	132·0
Sandfly Fever	12·7	·9	7·1
Pyrexia of uncertain origin	43·4	30·4	37·7
Tubercle of the lungs	1·6	1·4	1·5
Pneumonia	2·3	1·6	2·0
Respiratory Diseases	14·4	11·7	13·0
Dysentery	6·0	9·3	7·7
Diarrhœa	11·6	10·2	11·1
Hepatic Abscess	1·1	1·1	1·0
,, Congestion and Inflammation	7·2	5·4	6·3
Venereal Diseases	54·4	64·7	58·9
All Causes	615·7	542·2	576·5
V.—Death rate of the year—			
Cholera	·13	·06	·10
Small-pox	...	...	...
Enteric Fever	·58	·74	·63
Malaria	·11	·09	·10
Pyrexia of uncertain origin	...	...	...
Heat-stroke	·16	·03	·10
Circulatory Diseases	·50	·28	·44
Tubercle of the lungs	·26	·19	·23
Pneumonia	·34	·15	·25
Respiratory Diseases	·24	·09	·17
Dysentery	·29	·19	·23
Diarrhœa	...	...	...
Hepatic Abscess	·58	·40	·48
All Causes	5·00	4·21	4·66

* Worked on the aggregates.

NO. III.—*Ratios of Geographical Groups, 1910.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Inlands.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII(*a*) Hill Stations.	XII*b* Hill Convalescent Depots, and Sanatoria.	India.
I.—STRENGTH	1,317	1,893	2,041	6,269	13,775	5,064	5,866	10,679	1,412	3,235	13,183	3,942	72,491
II.—ADMISSION RATE OF THE YEAR—													
Influenza	12·1	...	...	·3	1·7	19·2	2·2	·9	...	·3	2·9	1·0	2·7
Cholera	...	...	...	1·0	...	...	...	...	...	...	...	·8	·1
Small-pox	·8	...	...	...	...	...	...	...	...	·3	·1	...	·0
Enteric Fever	·8	1·1	1·0	6·2	5·2	4·9	6·0	6·7	2·8	4·9	2·5	7·6	4·6
Malaria	9·9	74·5	51·0	69·4	167·0	334·3	287·4	65·9	94·9	67·7	85·5	166·4	132·0
Sandfly Fever	...	...	...	6·7	2·6	83·1	·5	...	...	...	·1	2·3	7·1
Pyrexia of uncertain origin ...	81·2	112·0	72·5	54·2	52·2	35·0	15·0	26·6	14·9	32·8	16·2	31·5	37·7
Rheumatic Fever	1·5	4·2	2·9	4·8	4·4	3·8	4·3	3·7	2·1	2·2	11·2	7·9	5·3
Tubercle of the lungs ...	1·5	4·2	2·4	·3	1·5	1·4	1·0	·7	1·4	1·2	1·7	3·8	1·5
Pneumonia ...	...	·5	1·0	4·0	1·7	3·8	2·4	1·8	2·8	1·2	1·2	2·3	2·0
Respiratory Diseases ...	6·8	14·3	15·2	18·0	13·0	18·0	13·3	9·5	12·0	14·5	11·1	17·0	13·0
Dysentery	6·8	6·9	7·3	6·9	6·7	4·3	7·8	13·0	11·3	10·8	4·6	5·8	7·7
Diarrhœa	...	13·2	5·9	11·3	10·2	16·8	15·2	8·1	13·5	9·6	10·5	16·0	11·1
Hepatic { Abscess ...	·8	2·6	1·0	·8	1·3	·4	·5	1·3	1·4	1·2	·3	4·1	1·0
Hepatic { Congestion and Inflammation ...	4·6	3·2	13·2	10·7	6·0	4·1	5·3	6·0	5·7	9·3	4·9	6·6	6·3
Venereal Diseases	72·9	78·7	64·7	74·8	48·1	47·0	56·4	69·0	109·8	81·9	48·1	51·2	58·9
ALL CAUSES ...	372·1	655·6	388·5	583·0	618·1	913·1	767·6	452·7	524·8	666·2	460·4	680·1	576·5
—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	·48	...	...	...	...	...	...	...	·51	·10
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	...	·53	...	·48	·80	·39	1·19	·93	1·42	·31	·23	1·27	·63
Malaria	...	...	...	...	...	·39	·51	...	...	·31	·08	...	·10
Pyrexia of uncertain origin ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	...	·16	·15	·39	·17	...	...	...	...	...	·10
Circulatory Diseases ...	1·52	...	...	·48	·73	·59	...	·37	...	...	·23	·51	·44
Tubercle of the lungs ...	·76	·53	·49	...	·07	·39	·34	·09	...	·31	·23	·51	·23
Pneumonia	...	...	·49	·32	·22	·59	·17	·19	...	·31	·38	...	·25
Respiratory Diseases ...	...	...	1·96	...	·22	...	...	·09	...	·31	·23	...	·17
Dysentery	...	...	·49	·48	·15	...	...	·37	...	·62	·30	·25	·23
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	...	...	·98	·64	·87	...	·34	·84	...	...	·23	·76	·48
ALL CAUSES ...	6·07	2·64	6·86	4·47	5·23	4·54	4·94	4·40	3·54	4·95	3·41	6·85	4·661

No. IV.—*Admission and death rates from Enteric fever in stations of over 1,000 strength.*

Stations.	1910.		Decennium, 1899-1908.		Stations.	1910.		Decennium, 1899-1908.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Sialkot	15·1	·84	16·9	4·53	Lucknow	4·2	...	29·4	5·52
Jhansi	13·1	4·67	32·0	9·28	Karachi	3·9	...	4·7	1·06
Kirkee	12·0	...	25·7	3·31	Secunderabad ...	3·4	1·25	21·3	4·57
Lahore Cantonment and Fort.	9·7	1·76	18·8	4·33	Aden	2·9	·96	6·0	1·98
Poona	8·4	...	22·0	4·74	Colaba (Bombay) ...	2·8	1·86	2·8	1·58
Belgaum	8·0	3·98	10·3	2·67	Meerut	2·3	·46	30·5	7·50
Peshawar	7·9	·61	23·0	6·59	Quetta	2·2	·27	21·7	4·37
Mhow and Indore ...	6·9	...	27·9	5·99	Wellington Depôt ...	1·9	·93	9·6	1·04
Jubbulpore	6·6	...	28·0	6·60	Ahmednagar ...	1·7	...	22·6	4·92
Bangalore	6·0	·50	2·17	3·33	Forts William, Fulta and Chingrikhal.	1·5	...	3·0	·44
Ranikhet and Chaubuttia	6·0	1·10	17·8	2·68	Chakrata	1·5	...	13·4	1·68
Rawalpindi	5·9	1·75	22·6	4·19	Rangoon	·8	...	3·8	1·06
Ambala	5·3	·41	21·5	5·10	Cawnpore	...	...	15·2	3·27
					Bareilly	...	...	12·9	2·04

No. V.—*Statistics of Officers.*

Sickness and Mortality among OFFICERS *of the* BRITISH ARMY *in 1910.*

	Northern Army.	Southern Army.	External.†	India.*
STRENGTH	1,165	1,110	...	2,365
CASES REMAINING FROM 1909	30	30	...	60
	Ratios.	Ratios.	...	Ratios.
CONSTANTLY SICK	24·3	20·4	...	21·6
INVALIDINGS	21·46	17·12	...	18·61
ADMISSIONS.				
Influenza	8·6	9·9	...	8·9
Cholera	...	...	...	...
Small-pox	·9	...	...	·4
Enteric Fever	12·0	6·3	...	9·3
Malaria	67·8	64·9	...	65·1
Sandfly Fever	20·6	·9	...	10·6
Pyrexia of uncertain origin	70·4	47·7	...	57·5
Tubercle of the lungs	...	...	...	...
Pneumonia	1·7	2·7	...	2·1
Respiratory Diseases	21·5	12·6	...	16·5
Dysentery	14·6	14·4	...	14·0
Diarrhœa	21·5	26·1	...	22·8
Hepatic Abscess	·9	1·8	...	1·3
,, Congestion and Inflammation	19·7	14·4	...	16·5
Venereal Diseases	...	...	...	...
ALL CAUSES	623·2	555·9	...	572·9
DEATHS.				
Cholera	...	...	...	·42
Small-pox	...	...	...	...
Enteric Fever	2·58	...	...	1·27
Malaria	...	...	...	...
Pyrexia of uncertain origin	...	...	...	...
Heat-stroke	...	...	...	...
Circulatory Diseases	·86	...	...	·42
Tubercle of the lungs	...	...	...	...
Pneumonia	...	...	...	...
Respiratory Diseases	·86	...	...	·42
Dysentery	...	...	...	...
Diarrhœa	...	...	...	...
Hepatic Abscess	...	·90	...	·42
Deaths not reported in Medical returns	...	...	...	...
ALL CAUSES	8·58	1·80	...	7·19
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES	...	...	...	8·03

* Including officers on the line of march.

† For cases and deaths not reported in military returns.

No. VI.—*Summary, Sickness and Mortality*

Geographical Groups.	Years.	Average Strength.*	RATIO PER					
			Constantly sick.	Invaliddings.†	A.—Admissions D.—Deaths.			
					Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1899-1908	1,332	25·7	...	2·1	...	...	...
	1909	1,419	24·0	...	...	...	...	...
	1910	1,284	24·1	...	...	...	...	...
„ II.—Burma Island	1899-1908	3,544	29·7	...	·3	·03	·2	·14
	1909	2,887	22·9	...	1·7	...	...	...
	1910	2,865	17·8	...	...	...	...	...
„ III.—Assam	1899-1908	1,182	34·0	...	3·9	·17	·4	·34
	1909	961	32·3	...	...	...	...	...
	1910	891	22·4	...	9·0	...	...	...
„ IV.—Bengal and Orissa	1899-1908	2,356	33·6	...	4·9	...	·4	·51
	1909	2,227	19·3	...	...	...	...	...
	1910	2,125	24·9	...	...	...	·5	·47
„ V.—Gangetic Plain and Chutia Nagpur ...	1899-1908	6,255	21·7	...	3·0	·02	1·2	·74
	1909	6,712	20·9	...	1·0	...	...	...
	1910	6,163	20·0	...	2·8	...	...	...
„ VI.—Upper Sub-Himalaya	1899-1908	17,259	22·6	...	2·0	·01	·7	·4
	1909	21,280	21·0	...	2·1	...	·1	·4
	1910	22,509	22·9	...	1·2	...	·0	·04
„ VII.—North Western Frontier, Indus Valley and North Western Rajputana.	1899-1908	17,392	29·3	...	6·1	...	1·7	·97
	1909	18,853	29·4	...	5·6	...	...	...
	1910	18,738	28·0	...	2·8	...	·5	·27
„ VIII.—South Eastern Rajputana, Central India and Gujarat.	1899-1908	12,227	26·8	...	2·1	·01	·9	·47
	1909	11,979	20·4	...	·8	...	...	...
	1910	11,320	17·9	...	2·4	...	·3	·09
„ IX.—Deccan	1899-1908	16,728	21·8	...	3·9	·06	1·5	·92
	1909	18,638	17·8	...	6·0	·05	·5	·4
	1910	17,645	18·9	...	1·8	...	·1	...
„ X.—Western Coast	1899-1908	2,055	30·6	...	·5	...	·2	·15
	1909	1,787	31·3	...	...	...	·6	·56
	1910	1,900	30·0	...	7·9	...	...	...
„ XI.—Southern India	1899-1908	6,025	27·0	...	1·0	...	1·4	·96
	1909	5,437	18·0	...	...	...	1·1	·37
	1910	5,377	26·6	...	...	...	·2	...
„ XII.—Hill Stations	1899-1908	21,095	30·7	...	7·9	·05	·6	·37
	1909	24,735	20·3	...	2·9	...	·3	·6
	1910	23,650	22·2	...	1·1	...	·0	·0
Army of India	1899-1908	1,25,240	25·4	10·05	4·8	·02	1·6	·64
	1909	1,31,627	20·8	5·74	2·9	·01	·2	·14
	1910	1,31,274	21·1	5·21	1·7	...	·2	·09

* The decennial ratios are worked on the total strength

† Details not

by Geographical Groups.

MILLE OF STRENGTH.

FROM

FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·2	...	·1	...	202·6	1·58	34·9	·08	2·4	·53	57·5	·38	42·4	·08	709·4	6·45
...	...	...	...	69·1	·70	193·8	...	2·8	2·11	74·7	...	14·8	...	727·3	7·05
...	...	...	...	1·3	...	131·6	·78	3·9	...	57·6	...	14·8	...	634·0	1·56
·1	...	·3	·03	388·3	2·00	13·1	...	2·9	·62	32·3	·28	23·1	·03	831·7	6·52
·3	...	·3	...	194·7	1·04	86·9	...	1·0	·35	11·8	...	15·6	...	653·3	3·46
·3	...	1·4	·35	113·4	·35	31·8	1·05	1·7	...	22·0	...	9·1	...	443·6	3·84
·1	...	1·7	·42	345·5	1·32	1·9	...	6·3	·85	64·7	·59	31·5	...	843·9	6·60
...	...	...	...	390·2	1·04	2·1	...	11·4	...	56·2	1·04	14·6	...	983·4	3·12
...	...	...	...	131·3	1·12	11·2	...	16·8	...	7·9	1·12	24·7	...	564·5	6·73
·5	...	·4	·13	480·1	2·33	6·8	·08	6·2	1·15	67·6	·68	32·0	·13	914·9	7·89
...	...	·4	·45	79·5	·45	44·5	·45	8·1	·45	67·8	·45	10·3	...	474·6	4·04
...	...	·5	...	107·8	...	118·6	...	7·5	2·35	36·2	·47	26·8	...	715·8	5·18
·6	·02	·3	·14	163·5	1·25	7·6	...	8·2	1·63	37·4	·26	19·3	·08	550·0	7·51
...	...	1·6	·74	203·4	·15	12·2	·60	13·1	1·94	43·4	·45	17·9	...	601·2	5·66
...	...	1·5	·49	79·2	·16	36·7	·32	9·9	1·78	21·7	...	22·4	·16	502·7	4·87
·9	·02	1·7	·40	233·6	1·34	8·1	·10	14·1	2·62	28·0	·18	19·9	·05	602·4	8·22
·2	·05	3·3	·56	163·6	·23	27·3	·23	16·5	3·20	27·9	·23	20·4	·05	546·5	7·57
·1	·04	2·0	·58	152·3	·40	32·1	·36	9·6	1·42	24·5	·04	18·7	...	581·5	5·46
·7	·03	1·0	·15	381·3	1·44	4·5	·03	20·8	4·50	48·4	·22	14·7	·03	881·3	10·57
·9	·05	2·5	·64	419·3	·21	21·1	...	19·1	2·76	49·2	·16	11·4	...	1014·4	6·74
·3	...	3·6	·64	361·7	·32	18·9	·21	14·9	2·78	36·8	·11	10·4	...	935·8	6·88
·7	·02	·9	·25	332·7	1·59	7·1	·01	14·3	2·87	28·2	·28	35·3	·07	762·9	9·13
·7	...	3·3	·50	218·1	·33	5·8	·17	9·7	1·34	18·8	...	16·8	...	607·0	3·76
·4	...	2·7	·35	139·8	·18	8·2	·27	10·2	1·24	15·6	·18	13·7	...	495·9	5·04
1·0	·05	·9	·20	165·3	·71	16·6	·05	7·7	1·10	29·8	·18	37·4	·05	566·0	7·74
·5	...	1·3	·11	90·8	·27	23·1	·11	6·7	·97	25·9	·05	19·7	...	455·5	3·76
·1	...	2·7	·17	65·2	·11	38·8	...	9·5	1·02	27·3	·17	23·8	·11	440·5	3·80
1·7	·05	·5	·29	222·3	1·56	6·8	·10	11·3	2·92	60·9	1·02	45·3	·15	757·5	13·29
·9	...	1·7	·56	241·7	1·12	7·8	...	5·0	...	83·9	·56	48·1	...	792·9	6·72
...	...	2·1	2·11	185·3	1·58	18·9	...	10·0	3·68	62·1	·53	32·1	...	695·3	11·58
·7	·05	·3	·05	156·1	·98	21·3	·07	9·1	1·91	24·4	·37	39·8	·08	597·1	10·06
·4	·18	·9	...	84·8	·37	16·9	...	11·8	1·47	29·2	...	22·3	...	455·2	5·52
...	...	·9	...	224·5	·37	27·7	·19	5·0	·56	25·1	...	26·8	·19	619·9	3·72
·3	·02	1·3	·38	284·8	1·74	14·8	·04	18·1	3·67	41·4	·35	26·9	·09	757·8	12·32
·2	·20	3·1	·73	124·0	·24	16·7	·08	12·5	2·47	20·6	·12	14·6	...	480·9	7·77
·1	...	4·5	·68	131·0	·17	28·3	·08	9·4	1·40	21·5	·04	16·8	...	543·2	5·03
·9	·02	·9	·21	266·5	1·37	10·5	·03	13·2	2·66	38·8	·31	25·4	·06	689·3	9·33
·3	·06	2·2	·43	179·8	·28	22·2	·13	11·8	1·88	31·8	·14	16·4	·01	584·2	5·62
·2	·01	2·5	·44	159·7	·25	28·5	·18	9·4	1·34	26·2	·09	16·9	·03	572·8	4·89

of the ten year period.
available.

No. VII.—*Ratios of Armies.*

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.
I.—Average Annual Strength	64,162	51,625	1,31,274
II.—Constantly sick rate of each month	23·9	20·9	21·1
III.—Invalidings	...	...	5·21*
IV.—Admission rate of the year—			
Influenza	1·5	2·1	1·7
Cholera	·2	·2	·2
Small-pox	·2	·2	·2
Enteric Fever	3·1	2·3	2·5
Malaria	202·1	123·1	159·7
Sandfly Fever	7·9	·0	3·9
Pyrexia of uncertain origin	32·1	27·3	28·5
Plague	·1	·5	·2
Tubercle of the lungs	3·2	1·7	2·4
Pneumonia	11·3	8·3	9·4
Respiratory Diseases	27·3	23·6	25·8
Dysentery	26·8	26·1	26·2
Diarrhœa	7·3	9·8	8·2
Hepatic { Abscess	·0	·1	·1
Hepatic { Congestion and Inflammation	·7	·7	·7
Scurvy	·4	1·0	·8
Venereal Diseases	16·8	18·9	16·9
All Causes ...	669·7	518·3	572·8
V.—Death rate of the year—			
Cholera	·09	·06	·09
Small-pox	·02	...	·01
Enteric Fever	·65	·27	·44
Malaria	·30	·23	·25
Sandfly Fever	...	...	...
Pyrexia of uncertain origin	·25	·15	·18
Plague	·09	·31	·17
Circulatory Diseases	·19	·19	·21
Tubercle of the lungs	·16	·25	·19
Pneumonia	1·79	1·16	1·34
Respiratory Diseases	·34	·23	·30
Dysentery	·09	·12	·09
Diarrhœa	·02	·06	·04
Hepatic Abscess	·02	·04	·02
Anæmia and Debility	·02	·02	·02
All Causes ...	5·69	4·57	4·89

* Details not available.

No. VIII.—*Ratios of Geographical Groups.*

	Ratio per 1,000 of the Average Strength.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India.*
I.—Average Annual Strength	1,284	2,865	891	2,125	6,163	22,509	18,738	11,320	17,645	1,900	5,377	23,650	131,274
II.—Admission rate of the year—													
Influenza	...	...	9·0	...	2·8	1·2	2·8	2·4	1·8	7·9	...	1·1	1·7
Cholera	...	...	...	·5	...	·0	·5	·3	·1	...	·2	·0	·2
Small-pox	...	·3	...	...	...	·1	·3	·4	·1	...	...	·1	·2
Enteric Fever	...	1·4	...	·5	1·5	2·0	3·6	2·7	2·7	2·1	·6	4·5	2·5
Malaria	41·3	113·4	131·3	107·8	79·2	152·3	361·7	139·8	65·2	185·3	224·5	131·0	159·7
Sandfly Fever	...	...	...	...	...	1·2	2·1	...	...	...	...	18·5	3·9
Pyrexia of uncertain origin	131·6	31·8	11·2	118·6	36·7	32·1	18·9	8·2	38·8	18·9	27·7	28·3	28·5
Plague	...	...	...	...	...	·1	·3	·7	·3	2·6	·7	...	·2
Tubercle of the lungs	·8	...	1·1	1·4	4·9	3·5	3·1	2·3	1·5	1·1	1·3	2·5	2·4
Pneumonia	3·9	1·7	16·8	7·5	9·9	9·6	14·9	10·2	9·5	10·0	5·0	9·4	9·4
Respiratory Diseases	35·0	22·0	42·6	53·6	22·9	25·5	31·9	21·2	21·7	42·1	22·1	22·4	25·8
Dysentery	57·6	22·0	7·9	36·2	21·7	24·5	36·8	15·6	27·3	62·1	25·1	21·5	26·2
Diarrhœa	5·5	6·6	3·4	9·9	4·7	6·8	14·3	7·4	6·5	5·8	9·1	8·1	8·2
Hepatic Abscess	...	...	...	...	...	·1	·1	...	·1	·5	·2	...	·1
Hepatic Congestion and Inflammation	2·3	...	1·1	1·4	·3	·5	·6	·5	·5	3·2	·9	·9	·7
Scurvy	·8	·7	·4	...	·6	·4	·4	·4	·3	3·2	·2	·9	·8
Venereal Diseases	14·8	9·1	2·7	26·8	22·4	18·7	10·4	13·7	22·8	32·1	26·8	16·8	16·9
All Causes	634·0	443·6	564·5	715·8	502·7	581·5	935·8	495·9	440·5	695·3	619·9	543·2	572·8
III.—Death rate of the Year—													
Cholera	...	...	...	·47	...	·04	·27	·09	...	...	...	·04	·09
Small-pox	...	...	...	...	...	·04	...	...	...	...	...	...	·01
Enteric Fever	...	·35	...	...	·49	·58	·64	·35	·17	2·11	...	·68	·44
Malaria	...	·35	1·12	...	·16	·40	·32	·18	·11	1·58	·37	·17	·25
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin	·78	1·05	...	...	·32	·36	·21	·27	...	...	·19	·08	·18
Plague	...	...	...	...	...	·09	·27	·53	·23	1·58	·37	...	·17
Circulatory Diseases	...	...	...	·94	...	·18	·21	·09	·11	·53	·56	·21	·21
Tubercle of the lungs	...	...	...	...	·32	·09	·05	·35	·28	...	...	·38	·19
Pneumonia	...	...	...	2·35	1·78	1·42	2·78	1·24	1·02	3·68	·56	1·40	1·34
Respiratory Diseases	...	·35	1·12	...	·32	·22	·32	·27	·23	·53	·19	·42	·30
Dysentery	...	...	1·12	·47	...	·04	·11	·18	·17	·53	...	·04	·09
Diarrhœa	...	...	...	...	...	·04	...	·18	...	...	...	·04	·04
Hepatic Abscess	...	...	...	...	...	·04	...	...	·06	·53	...	...	·02
Anæmia and Debility	...	...	...	...	...	...	·05	...	·06	...	...	...	·02
All Causes	1·56	3·84	6·73	5·18	4·87	5·46	6·88	5·04	3·80	11·58	3·72	5·03	4·89

* Including Group Extra India and Field Force.

No. IX, Part I.—Summary, sickness

A.—Administrations.	Years.	Average Strength.‡	Constantly sick.	RATIO PER MILLE			
				A.—Admissions D.—Deaths			
				Cholera.		Small-pox.	
				A.	D.	A.	D.
Burma	1899-1908	12,492	21	1·5	·86	·3	·08
	1909	13,680	16	3·4	2·34	...	...
	1910	14,744	15	·4	·27	...	...
Eastern Bengal and Assam	1899-1908	6,485	43	1·8	1·42	·4	·06
	1909	7,173	37	2·2	1·53	·6	·14
	1910	7,436	39	1·2	·81	...	...
Bengal	1899-1908	14,644	37	2·8	1·49	·7	·08
	1909	16,036	40	·2	·19	1·4	·06
	1910	13,947	36	·6	·22	·4	·07
United Provinces of Agra and Oudh	1899-1908	26,524	33	·5	·34	·7	·07
	1909	26,020	28	1·7	1·00	·5	...
	1910	25,362	23	·6	·35	·1	...
Punjab	1899-1908	12,794	31	·4	·17	·6	·07
	1909	11,526	28	·2	·09	·5	...
	1910	11,875	29	...	...	·3	...
North-West Frontier Province	1899-1908	1,287	34	·1	...	1·6	·39
	1909	1,354	27	...	...	...	...
	1910	1,436	26	...	...	1·4	·70
Central Provinces	1899-1908	4,523	25	1·9	1·26	·5	·09
	1909	4,297	18	...	...	·5	...
	1910	3,998	21	1·0	·25	·8	...
Bombay	1899-1908	8,749	30	2·2	1·11	1·5	·13
	1909	7,591	28	...	...	·1	...
	1910	8,071	25	...	...	·7	...
Madras	1899-1908	9,933	21	5·5	2·50	·3	·03
	1909	10,815	25	8·3	3·51	·1	...
	1910	10,559	21	·1	...	·2	...
India *	1899-1908	97,634	30	1·8	·95	·7	·08
	1909	99,104	28	2·0	1·12	·5	·02
	1910	98,032	26	·4	·23	·3	·03
Andamans	1899-1908	13,249	65	·0	·01	...	...
	1909	13,145	94	...	...	...	...
	1910	12,423	90	...	...	...	...
India †	1899-1908	110,883	34	1·6	·84	·6	·07
	1909	112,249	36	1·8	·99	·4	·02
	1910	110,455	33	·4	·21	·2	·03

* Including Ajmer, Sibi, Quetta, Mercara and Secunderabad and excluding Andamans.

† Including Andamans.

‡ The decennial ratios are worked on the total strength of the ten year period.

and mortality.

OF STRENGTH.

FROM

FROM

Malaria.		Tubercle of the lungs.		Pneumonia.		Respiratory Diseases.		Dysentery.		Diarrhœa.		Anæmia and Debility.		All Causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
86·4	·58	8·3	3·69	4·8	1·33	11·3	·42	44·1	2·55	24·8	·60	4·5	·31	415·9	16·27
35·5	·29	8·0	4·24	2·2	·66	12·4	·29	20·5	1·68	12·3	·51	3·1	·22	309·9	16·15
45·4	·14	6·8	2·91	2·9	·81	18·6	·61	14·3	1·29	10·2	...	2·8	·14	309·1	11·98
288·5	2·70	10·1	3·48	10·3	3·62	35·3	1·11	273·4	8·42	81·5	1·19	23·1	1·28	1,033·4	30·95
247·9	2·79	8·4	3·62	15·8	4·04	26·2	1·39	200·2	8·09	94·2	·28	17·4	1·12	899·1	29·97
173·9	2·42	13·0	6·45	13·0	4·03	31·2	1·88	202·4	7·93	45·2	·94	19·9	1·88	793·0	34·16
310·1	1·65	11·9	4·20	11·0	2·63	32·4	·71	196·8	5·99	86·7	1·43	10·2	·67	980·9	25·36
273·8	2·06	12·9	4·24	10·0	2·68	32·7	·87	151·5	6·42	90·8	·87	10·7	·75	916·0	25·13
281·8	1·43	7·5	3·30	8·4	2·22	32·9	·57	99·2	3·59	110·5	·57	12·2	·50	876·0	18·36
244·5	1·04	7·7	2·79	14·0	3·23	24·5	·94	46·7	3·68	30·3	1·12	15·7	·37	697·2	19·57
212·1	1·23	10·0	3·31	22·4	5·30	19·4	·96	40·0	4·27	21·9	1·96	7·9	·31	573·7	23·79
123·2	·87	6·3	2·37	14·2	2·96	21·5	·83	25·8	1·85	23·0	1·22	5·7	·28	461·7	15·65
392·0	·82	8·7	3·90	18·4	4·55	39·2	·66	57·7	2·92	62·5	·92	20·7	·62	948·0	21·18
139·3	·26	15·4	5·47	23·9	6·16	29·2	1·13	38·9	1·91	37·7	2·08	20·8	·52	612·7	25·16
116·0	·25	18·3	6·57	22·2	4·38	43·3	1·52	46·6	3·87	37·4	1·18	20·7	1·09	575·7	28·63
484·6	1·01	4·9	1·17	19·7	4·20	32·7	·93	67·7	3·11	46·6	·62	15·9	·31	1,084·6	19·20
504·4	1·48	9·6	2·95	24·4	4·43	30·3	1·48	99·9	2·22	13·3	...	10·3	...	1,021·4	20·68
353·1	...	7·0	2·79	15·3	3·48	45·6	2·09	71·0	1·39	37·6	·70	9·1	·70	870·5	23·68
277·9	·80	5·2	2·76	11·1	2·76	21·8	1·30	62·2	6·46	53·3	2·59	22·4	1·70	760·0	27·97
151·3	1·16	4·0	1·63	6·3	·93	12·7	1·63	29·6	3·72	34·7	...	8·8	·23	514·3	15·59
104·8	·75	10·3	4·75	5·5	1·75	17·5	2·00	87·3	16·26	32·5	1·00	11·0	·50	499·7	36·52
200·9	1·65	6·1	3·07	20·5	5·67	34·3	1·47	52·7	2·23	41·3	1·85	11·3	1·06	690·9	27·16
123·8	1·32	3·7	1·98	13·0	3·16	28·1	·99	38·2	1·98	34·4	·99	13·2	1·05	580·2	17·92
96·3	1·91	3·1	·99	11·6	2·73	26·0	·62	43·9	·99	29·0	1·49	19·1	·62	511·0	14·62
86·5	1·00	10·1	3·18	8·3	1·86	24·4	·61	57·0	3·20	5·5	·11	6·8	·49	465·8	20·62
81·0	·83	10·1	3·88	8·0	1·94	25·2	·60	65·0	5·92	7·7	...	20·7	1·20	496·6	25·24
94·2	·57	9·4	2·65	5·6	1·61	23·4	·28	49·1	3·88	11·6	...	10·2	·09	451·1	15·25
240·1	1·22	8·6	3·33	12·7	3·18	27·3	·82	87·7	4·03	45·2	1·13	13·6	·99	740·7	22·23
172·4	1·19	9·6	3·72	14·3	3·60	23·3	·84	70·2	4·20	38·6	1·04	11·8	·60	617·6	22·85
134·7	·90	8·7	3·41	11·0	2·57	26·8	·91	57·7	3·46	36·9	·80	11·0	·53	549·4	19·29
1,165·6	3·50	10·6	6·93	11·6	4·26	65·2	1·19	139·8	8·95	50·8	1·58	5·5	·57	1,851·1	34·31
1,075·4	4·56	8·4	7·00	18·2	6·24	56·5	1·45	149·4	8·98	25·3	·61	...	...	1,761·3	41·38
995·1	5·07	14·7	8·53	19·2	7·08	57·9	·72	98·3	7·41	25·1	·24	...	...	1,566·3	40·01
350·6	1·49	8·9	3·76	12·5	3·31	31·8	·87	93·6	4·62	45·9	1·18	12·6	·64	873·4	23·67
278·1	1·59	9·7	4·11	14·8	3·91	27·2	·91	79·5	4·76	37·0	·66	10·4	·53	751·8	25·02
231·5	1·37	9·4	3·98	11·9	3·08	30·3	·89	62·3	3·90	35·6	·73	9·7	·47	663·8	21·62

No. IX, Part II.—Summary,

B. Groups.	Years.	Average strength.*	Constantly sick.	RATIO PER A.—ADMIS D.—DEA			
				Influenza.		Cholera.	
				A.	D.	A.	D.
Group I.—Burma Coast and Bay Islands	1899-1908	15,993	38	6·8	·03	·7	·44
	1909	9,552	17	...	...	·9	·31
	1910	10,361	15	11·1	...	·3	·19
„ II.—Burma Inland	1899-1908	3,996	20	3·1	...	1·7	·93
	1909	4,128	13	...	...	9·2	7·03
	1910	4,413	13	...	...	·7	·45
„ III.—Assam	1899-1908	1,326	38	21·2	....	3·5	2·87
	1909	1,416	33	4·9	...	1·4	1·41
	1910	1,630	31	8·0	...	1·9	1·23
„ IV.—Bengal and Orissa	1899-1908	12,218	41	20·5	·35	2·0	1·10
	1909	13,271	41	3·1	...	1·1	·68
	1910	13,207	40	·2	...	·7	·38
„ V.—Gangetic Plain and Chutia Nagpur	1899-1908	24,525	32	12·8	·12	1·4	·80
	1909	25,201	29	1·1	...	1·8	1·15
	1910	22,617	25	·5	...	·8	·44
„ VI.—Upper Sub-Himalaya	1899-1908	13,380	32	16·6	·31	·4	·17
	1909	12,599	31	1·3	....	·2	·08
	1910	12,637	25	1·5	...	...	...
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1899-1908	8,127	29	7·2	·22	·2	·07
	1909	7,928	30	5·2	...	...	...
	1910	8,763	29	·6	...	...	...
„ VIII.—South-Western Rajputana, Central India and Gujarat.	1899-1908	4,882	37	8·3	·06	·5	·29
	1909	4,299	25	...	...	...	...
	1910	4,297	29	...	...	...	...
„ IX.—Deccan	1899-1908	8,418	30	10·4	·14	2·2	1·24
	1909	7,769	26	1·0	...	...	...
	1910	7,482	27	3·7	...	·7	·27
„ X.—Western Coast	1899-1908	2,655	24	·8	...	3·9	2·11
	1909	2,385	22	...	...	...	...
	1910	2,363	21	...	...	...	...
„ XI.—Southern India	1899-1908	8,942	21	2·3	·01	5·5	2·39
	1909	9,901	25	·8	...	9·1	3·84
	1910	9,638	21	...	...	·1	...
„ XII.—Hills	1899-1908	620	29	6·9	...	8·9	5·48
	1909	584	35	...	...	...	...
	1910	565	27	...	...	...	...
India†	1899-1908	97,634	30	10·8	·15	1·8	·95
	1909	99,104	28	1·5	...	2·0	1·12
	1910	98,032	26	2·0	...	·4	·23
Andamans	1899-1908	13,249	65	11·9	·01	·0	·01
	1909	13,145	94	·2	...	...	...
	1910	12,423	90	·1	...	...	...
India‡	1899-1908	110,883	34	10·9	·13	1·6	·84
	1909	112,249	36	1·4	...	1·8	·99
	1910	110,455	33	1·8	...	·4	·21

* The decenial ratios are, worked on the total strength of the ten year period.
† Including Aden and excluding Andamans.
‡ Including Andamans.

Sickness and Mortality.

MILLE OF STRENGTH.

SIONS FROM

THS FROM

Small-pox.		Enteric Fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhœa.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A	D.
·2	·04	·3	·11	568·1	2·15	10·4	·01	6·9	2·37	93·2	6·28	39·5	1·27	1,098·0	25·55
...	...	·5	·10	40·6	·31	22·4	...	2·4	·73	20·0	1·78	9·8	·21	326·3	15·91
...	...	1·6	·58	56·8	·10	27·5	...	2·9	·58	12·3	1·16	12·0	...	446·4	11·77
·3	·10	·7	·28	98·9	·63	5·0	...	7·4	2·05	56·1	3·38	30·9	1·23	418·8	18·94
...	...	1·5	·24	23·7	·24	23·7	...	1·7	·48	21·6	1·45	17·9	1·21	272·0	16·72
...	...	...	...	18·4	·23	17·7	...	2·9	1·36	19·3	1·59	5·9	...	221·4	12·46
·6	·08	·2	·08	317·7	4·53	2·2	...	6·4	2·34	191·5	9·65	62·1	1·43	855·0	34·69
·7	...	·7	...	582·6	6·36	1·4	...	41·1	4·24	81·2	7·77	218·2	·71	1,260·6	32·49
...	...	4·9	1·84	227·6	2·45	·6	...	13·5	3·07	134·4	4·29	66·9	1·84	766 3	31·90
·4	·07	·7	·20	298·8	2·04	28·6	·02	11·2	3·30	248·7	7·40	83·3	1·19	1,020·9	27·90
1·4	·08	1·4	·45	222·8	2·19	7·9	...	13·6	3·32	176·1	5·05	76·8	·45	873·6	23·74
·3	...	·8	·23	265·8	1·59	8·2	...	11·4	3·10	141·2	4·85	88·5	·45	877·0	22·56
·8	·06	·3	·11	252·0	1·26	8·0	·02	11·3	2·57	85·8	4·16	47·3	1·25	752·1	20·99
·8	·04	1·3	·24	188·4	1·39	7·0	·04	14·7	3·17	78·3	5·95	42·5	1·56	626·0	24·05
·2	·04	·4	·13	123·9	1·15	3·6	·04	9·2	1·90	52·5	3·14	37·1	1·11	59·0	17·64
·6	·10	·6	·19	403·6	·86	4·3	·01	18·7	4·54	59·0	3·36	51·6	1·17	932·3	20·09
·2	...	·2	·16	283·8	·87	5·3	...	31·9	8·65	47·5	3·41	33·6	2·38	734·3	27·86
·2	...	...	...	157·6	·47	2·8	...	21·0	4·75	27·4	1·82	31·4	1·35	548·4	20·97
1·1	·14	·2	·10	282·9	1·22	1·7	·01	25·2	6·57	50·0	2·51	48·2	·66	771·3	23·02
·5	...	·5	...	190·2	·63	2·5	·13	23·0	5·30	51·3	2·65	30·4	1·39	641·0	25·10
·9	·23	1·0	·23	129·2	1·48	1·3	...	22·0	4·91	63·9	4·45	30·8	·68	580·1	28·07
1·0	·96	·2	·08	238·3	·98	·3	·04	22·5	5·20	41·0	3·18	31·4	1·33	687·6	23·46
...	...	...	...	137·9	1·40	·9	...	18·1	5·82	24·9	1·86	22·8	1·63	479·4	20·24
·2	...	·2	·23	136·1	·47	4·2	·23	17·5	3·72	17·0	·23	56·1	2·09	606·0	16·52
·7	·12	·3	·12	274·5	·80	4·1	...	9·6	2·48	58·9	4·18	50·8	2·33	812·8	23·24
·4	...	·5	·13	154·8	1·16	2·6	...	5·1	1·16	35·9	2·19	37·2	...	629·0	14·42
·4	...	·8	·27	125·2	·53	9·5	...	5·2	1·60	74·3	9·49	31·7	·80	607·2	24·19
1·2	·11	4·9	1·13	147·3	2·90	10·4	...	9·0	2·49	63·5	3·31	35·6	2·01	547·4	34·17
...	...	...	...	69·6	2·10	36·5	...	6·7	2·52	52·4	2·94	31·9	·42	521·2	23·90
·8	...	5·9	·85	64·3	1·69	18·2	·85	9·7	2·54	63·9	2·12	48·7	2·12	499·4	25·39
·3	·03	·9	·25	87·3	·82	30·7	...	8·2	1·93	56·0	3·01	4·9	·09	473·5	19·85
·1	...	1·0	·30	81·9	·40	27·7	...	8·5	2·02	67·0	6·16	6·2	...	471·2	24·95
·2	...	1·2	·10	95·0	·42	23·9	...	5·1	1·35	45·3	3·74	5·4	...	422·0	13·38
·8	...	2·1	1·13	254·3	3·39	23·9	...	20·2	5·32	87·4	7·26	59·7	4·03	849·1	39·66
...	...	1·7	1·71	352·7	1·71	5·1	...	32·5	11·99	123·3	13·70	113·0	1·71	1,099·3	41·10
...	...	1·8	...	249·6	3·54	1·8	...	17·7	1·77	90·3	5·51	61·9	1·77	950·4	23·01
·7	·08	·6	·20	240·1	1·22	11·9	·01	12·7	3·18	87·7	4·03	45·2	1·13	740·7	22·23
·5	·02	·6	·21	172·4	1·19	10·8	·02	14·3	3·60	70·2	4·20	38·6	1·04	617·9	22·85
·3	·03	·6	·23	134·7	·90	9·8	·03	11·0	2·57	57·7	3·46	36·9	·80	549·4	19·29
...	...	·0	...	1,165·6	3·50	4·1	·01	11·6	4·26	139·8	8·95	50·8	1·58	1,851·1	34·31
...	...	·5	·08	1,075·4	4·56	53·8	...	18·2	6·24	149·4	8·98	25·3	·61	1,761·3	41·38
...	...	·1	·08	995·1	5·07	·3	·08	19·2	7·08	98·3	7·41	25·1	·24	1,566·3	40 01
·6	·07	·6	·17	350·6	1·49	10·9	·01	12·5	3·31	93·9	4·62	45·9	1·18	873·4	23·67
·4	·02	·8	·20	278·1	1·59	15·8	·02	14·8	3·91	79·5	4·76	37·0	·99	751·8	25·02
·2	·03	·8	·22	231·5	1·37	8·8	·05	11·9	3·08	62·3	3·90	35·6	·73	663·8	21·62

No. X.—*Ratios of administrations.*

	Ratios per 1,000 of the average strength.											
	Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces.	Punjab.	N.-W. F. Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—Average Annual Strength	14,774	7,436	13,947	25,362	11,875	1,436	3,998	8,071	10,559	98,032	12,423	110,455
II.—Admission rate of the year—												
Influenza	7·8	2·0	...	·8	1·2	...	7·0	·1	...	2·0	·1	1·8
Cholera	·4	1·2	·6	·6	...	...	1·0	...	·1	·4	...	·4
Small-pox	...	...	·4	·1	·3	1·4	·8	·7	·2	·3	...	·2
Enteric Fever	1·2	1·6	1·1	·2	·4	2·8	·8	·6	2·1	·9	·1	·8
Malaria	45·4	173·9	281·8	123·2	116·0	353·1	104·8	96·3	94·2	134·7	996·1	231·5
Pyrexia of uncertain origin	24·6	14·4	3·0	2·2	3·0	...	6·5	7·7	25·4	9·8	·3	8·8
Tubercle of the lungs	6·8	13·0	7·5	6·3	18·3	7·0	10·3	3·1	9·4	8·7	14·7	9·4
Pneumonia	2·9	13·0	8·4	14·2	22·2	15·3	5·5	11·6	5·6	11·0	19·2	11·9
Respiratory Diseases	18·6	31·2	34·9	21·5	43·3	44·6	17·5	26·0	23·4	26·8	57·9	30·3
Dysentery	14·3	202·4	99·2	25·8	46·6	71·0	87·3	48·9	49·1	57·7	98·3	62·3
Diarrhœa	10·2	45·2	110·5	23·0	37·4	37·6	32·5	29·0	11·6	36·9	25·1	35·6
Spleen Diseases	·1	·1	·4	·1	3·3	2·8	·5	1·6	...	·7	1·0	·7
Scurvy	·4	3·8	·4	...	·3	...	...	·9	...	·5	1·0	·6
Anæmia and Debility	2·8	19·9	12·2	5·7	20·7	9·1	11·0	19·1	10·2	11·0	...	9·7
Abscess, Ulcer, and Boil	45·6	39·9	58·9	81·1	77·9	147·0	48·3	46·6	31·9	60·8	43·1	58·8
All Causes ...	309·1	793·0	876·0	461·7	575·7	870·5	499·7	511·0	451·1	549·4	1,566·3	663·8
Including Subsidiary Jails and Lock-ups— ...	799·7	872·2	...	574·7	895·3	500·4	562·5	502·5	560·8	...	668·9	
III.—Death rate of the year—												
Cholera	·27	·81	·22	·35	...	...	·25	...	...	·23	...	·21
Small-pox	...	...	·07	...	...	·70	...	...	...	·03	...	·03
Enteric Fever	·41	·67	·14	·12	·17	...	·50	...	·28	·23	·08	·22
Malaria	·14	2·42	1·43	·87	·25	...	·75	1·61	·57	·90	5·07	1·37
Pyrexia of uncertain origin	...	...	...	·04	...	...	...	·37	...	·03	·08	·05
Tubercle of the lungs	2·91	6·45	3·30	2·37	6·57	2·79	4·75	·99	2·65	3·41	8·53	3·98
Pneumonia	·81	4·03	2·22	2·96	4·38	3·48	1·75	2·73	1·61	2·57	7·08	3·08
Respiratory Diseases	·61	1·88	·57	·83	1·52	2·09	2·00	·62	·28	·91	·72	·89
Dysentery	1·29	7·93	3·59	1·85	3·87	1·39	16·26	·99	3·88	3·46	7·41	3·90
Diarrhœa	...	·94	·57	1·22	1·18	·70	1·00	1·49	...	·80	·24	·73
Hepatic Abscess...	·07	...	·07	·08	·42	...	·50	...	...	·11	·08	·11
Anæmia and Debility	·14	1·88	·50	·28	1·09	·70	·50	·62	·09	·53	...	·47
Phagedæna, Slough, and Gangrene ...	·27	...	...	...	·17	...	...	...	...	·06	·16	·07
All Causes ...	11·98	34·16	18·36	15·65	28·63	23·68	36·52	14·62	15·25	19·29	40·01	21.62
Including Subsidiary Jails and Lock-ups ...	32·57	18·64	...	28·42	22·68	36·47	14·39	14·46	19·03	...	21·28	

* Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and excluding Andamans.
† Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and Andamans.

No. XI.—*Ratios of Geographical Groups.*

	Ratios per 1,000 of the average strength.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hills.	India.*
I.—Average Annual Strength	10,361	4,413	1,630	13,207	22,617	12,637	8,763	4,297	7,482	2,363	9,638	565	98,032
II.—Admission Rate of the year—													
Influenza	11·1	...	8·0	·2	·5	1·5	·6	...	3·7	...	...	...	2·0
Cholera	·3	·7	1·9	·7	·8	...	...	...	·7	...	·1	...	·4
Small-pox	...	...	...	·3	·2	·2	·9	·2	·4	·8	·2	...	·3
Enteric Fever	1·6	...	4·9	·8	·4	...	1·0	·2	·8	5·9	1·2	1·8	·9
Malaria	56·8	18·4	227·6	265·8	123·9	157·6	129·2	136·1	125·2	64·3	95·0	249·6	134·7
Pyrexia of uncertain origin	27·5	17·7	·6	8·2	3·6	2·8	1·3	4·2	9·5	18·2	23·9	1·8	9·8
Tubercle of the lungs	7·5	4·8	7·4	9·7	6·7	11·5	14·5	5·4	6·5	4·7	9·9	21·2	8·7
Pneumonia	2·9	2·9	13·5	11·4	9·2	21·0	22·0	17·5	5·2	9·7	5·1	17·7	11·0
Respiratory Diseases	22·4	9·7	20·2	33·6	22·2	26·1	47·5	41·7	19·9	25·8	22·6	44·2	26·8
Dysentery	12·3	19·3	134·4	141·2	52·5	27·4	63·9	17·0	74·3	63·9	45·3	90·3	57·7
Diarrhœa	12·0	5·9	66·9	88·5	37·1	31·4	30·8	56·1	31·7	48·7	5·4	61·9	36·9
Spleen Diseases	·1	...	...	·3	·1	2·9	2·4	...	·5	...	...	...	·7
Scurvy	·1	1·1	15·3	·5	·0	·1	1·1	...	...	...	...	...	·5
Anæmia and Debility	3·1	2·0	12·3	17·2	6·6	12·8	21·1	12·6	15·1	16·5	8·4	7·1	11·0
Abscess, Ulcer, and Boil	50·2	35·1	36·8	52·8	68·7	80·1	82·6	91·9	58·9	30·9	30·6	56·6	60·8
All Causes	346·4	221·4	766·3	877·0	509·0	548·4	580·1	606·0	607·2	499·4	422·0	950·4	549·4
III.—Death rate of the year—													
Cholera	·19	·45	1·23	·38	·44	...	...	...	·27	...	...	...	·23
Small-pox	...	...	...	...	·04	...	·23	...	...	...	...	...	·03
Enteric Fever	·58	...	1·84	·23	·13	...	·23	·23	·27	·85	·10	...	·23
Malaria	·10	·23	2·45	1·59	1·15	·47	1·48	·47	·53	1·69	·42	3·54	·90
Pyrexia of uncertain origin	...	...	...	...	·04	...	...	·23	...	·85	...	...	·03
Tubercle of the lungs	3·19	2·27	4·91	4·39	2·87	4·19	4·68	2·79	2·81	2·54	2·70	1·77	3·41
Pneumonia	·58	1·36	3·07	3·10	1·90	4·75	4·91	3·72	1·60	2·54	1·35	1·77	2·57
Respiratory Diseases	·68	·45	1·23	1·14	·80	·87	1·83	1·16	1·07	·85	·21	1·77	·91
Dysentery	1·16	1·59	4·29	4·85	3·14	1·82	4·45	·23	9·49	2·12	3·74	5·31	3·46
Diarrhœa	...	...	1·84	·45	1·11	1·35	·68	2·09	·80	2·12	...	1·77	·80
Hepatic Abscess	·10	...	...	...	·09	·32	·23	...	·27	...	...	...	·11
Anæmia and Debility	·10	·23	3·07	1·06	·35	·47	1·03	·70	·53	...	·10	...	·53
Phagedæna, Slough, and Gangrene.	·29	·23	...	...	...	·16	...	...	...	...	...	...	·06
All Causes	11·77	12·46	31·90	22·56	17·64	20·97	23·07	16·52	24·19	25·39	13·38	23·01	19·29

* Including Aden.

TABLE XII.—*Provincial Birth and Death Statistics.*

Province.	Year.	Births.			Number of deaths.			Ratio of deaths per 1,000 of population.			Highest Death-rate		Lowest Death-rate.		Mean death-rate during previous five years.			Number of deaths of males to every 100 deaths of females.
		Total number.	Raito per 1,000 of population	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Bengal ...	1909	1,909,547	37·79	38·40	92,186	1,451,785	1,543,971	28·66	30·68	30·55	65·49	44·42	4·06	19·34	35·73	36·43	36·39	108
	1910	2,007,222	39·72	37·59	90,423	1,582,217	1,672,640	27·99	33·45	33·10	62·82	51·23	7·35	20·13	34·20	36·32	36·19	108
Eastern Bengal and Assam.	1909	1,206,417	40·46	39·12	15,067	995,288	1,010,355	23·70	34·11	33·89	48·48	43·71	2·00	25 05	24·14	31·94	31 77	110
	1910	1,131,924	37·96	39·07	14,770	990,226	1.004,996	23·23	33·93	33·71	62·23	43·07	7·40	24·11	23·83	32·31	32·13	108
United Provinces of Agra and Oudh.	1909	1,589,196	33·32	41·35	126,364	1,654,705	1,781,069	37·56	37·33	37·34	67·63	49·17	16·44	25·70	51·25	42·15	42·79	107·37
	1910	1,955,424	41·00	38·68	135,209	1,708,969	1,844,178	40·17	38·55	38·67	75·84	59·23	15·00	26·23	48·94	42·89	43·32	109·40
Punjab ...	1909	705,910	35·1	42·4	68,317	552,766	621,083	34·62	30·48	30·89	73·32	38·16	4·11	17·06	50·36	49·16	49·28	110·9
	1910	859,432	42·7	41·1	67,597	601,642	669,239	34·42	33·16	33·28	92·67	55·87	1·87	20·42	47·83	45·40	45·64	106·4
North-West Frontier Province.	1909	66,111	34·7	36·7	4,471	46,220	50,691	25·07	26·57	26·57	33·35	31·33	10·56	22·44	33·42	32·73	32·78	113·8
	1910	72,785	38·1	36·3	4,728	46,513	51,241	25·71	26·97	26·85	44·48	31·25	7·27	24·72	31·91	32·34	32·13	115·0
Central Provinces and Berar.	1909	617,987	51·63	53·01	48,687	347,448	396,135	39·30	32·38	33·09	89·78	42 52	15·72	25·13	43·96	37·82	38·44	112·49
	1910	663,400	55·42	52·33	54,187	483,065	537,252	43·57	45·03	44·88	93·31	60·28	20·87	35·36	...	...	38·56	109·73
Madras Presidency.	1909	1,215,717	33·1	31·4	112,711	688,855	801,566	26·4	21·2	21·8	55·2	27·2	2·9	16·0	30·4	23·5	24·4	105·0
	1910	1,235,169	33·6	31·8	123,219	784,203	907,422	28·9	24·1	24·7	86·1	34·5	3·3	18·1	30·0	23·4	24·2	103·7
Coorg ...	1909	4,981	27·58	24·28	704	4,380	5,084	46·17	26·49	28·15	62·10	37·05	29·25	18·38	40·38	29·53	30·44	124·46
	1910	4,638	25·68	25·40	790	6,032	6,822	51·80	36·48	37·77	72·78	44·09	25·87	29·62	41·85	29·73	30·75	120·56
Bombay Presidency.	1909	657,685	35·59	34·15	92,393	413,543	505,936	34·82	25·80	27·38	72·92	39·40	8·50	11·85	46 45	31·53	33·65	109·45
	1910	689,701	37·32	34·25	94,690	465,313	560,003	35·69	29·03	30·30	58·63	44·67	3·89	14·52	42·37	28·83	30·85	107·94
Lower Burma ...	1909	196,179	35·27	33·22	28,209	125,860	154,069	39·97	25·92	27·70	63·54	37·72	22·14	18·87	39·17	23·92	25·85	125
	1910	197,240	35·46	33·73	26,823	123,286	150,109	38·01	25·39	26·99	63·17	36·45	21·79	19·36	41·13	24·88	25·92	126
Upper Burma ...	1909	110,628	37·10	...	15,680	88,113	103,793	47·55	33·22	34·81	70·55	54·51	29·74	26·19	39·36	22·64	24·42	102
	1910	110,701	37·13	...	12,891	77,359	90,250	39·09	29·17	30·27	63·77	36·73	15·97	21 03	42·60	25·84	27·66	101
Ajmer-Merwara	1909	18,021	37·78	34·69	9,378	14,914	24,292	72·34	42·95	50·94	124·28	104·89	35·73	21·61	45·09	28·13	32·74	100·26
	1910	20,355	42·68	35·54	5,991	17,891	23,882	46·22	51·52	50·08	87·47	74·36	25·03	28·15	52·17	31·91	37·41	100·94

TABLE XIII.—*Births.*

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Bengal	50,521,604	53·86	20·17	39·72	105	6·62	...
Eastern Bengal and Assam ...	29,812,735	50·20	30·22	37·96	107	4·25	...
United Provinces of Agra and Oudh.	47,691,782*	58·12	28·67	41·00	108·39	2·33	...
Punjab	20,108,690	79·9	19·5	42·7	109·5	9·4	...
North-West Frontier Province ...	1,908,184	44·1	34·5	38·1	124·4	11·2	...
Central Provinces and Berar ...	11,970,201	65·23	46 99	55·42	105·48	10·54	...
Madras Presidency	36,742,903	41·2	21·3	33·6	104·7	8·9	...
Coorg	180,607	39·38	19·74	25·68	107·24	...	12·09
Bombay Presidency	18,481,362	64·27	16·99	37·32	107·90	7·02	...
Burma... Lower	5,561,944	48·95	20·55	35·46	107	8	...
Burma... Upper	2,981,809	43·12	27·96	37·13	106	7	...
Ajmer-Merwara	476,912	54·44	39·19	42·68	113·07	...	7·40

* Includes 16,010 persons enumerated at the Ajodhya fair.

TABLE XIV.—*Deaths.*

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of deaths per 1,000 of population.			Death rate by sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Bengal	50,521,604	110,507	457	49·34	20·10	33·10	34·74	31·49
Eastern Bengal and Assam	29,812,735	71,555	416	42·67	23·89	33·71	34·48	32·90
United Provinces of Agra and Oudh.	47,691,782*	107,164	445	59·54	26·23	38·67	39·14	38·17
Punjab	20,108,690	97,209	207	55·3	22·0	33·3	32·0	34·8
North-West Frontier Province.	1,908,184	13,688	149	30·3	24·6	26·9	26·9	26·8
Central Provinces and Berar.	11,970,201	99,803	120	60·96	35·65	44·88	47·43	42·38
Madras Presidency ...	36,742,903	129,372	284	40·3	17·8	24·7	25·5	23·9
Coorg	180,607	1,583	114	45·04	33·54	37·77	37·19	38·49
Bombay Presidency ...	18,481,362	122,984	150	44·03	16·08	30·30	30·50	30·08
Burma {Lower ...	5,561,944	75,952	73	38·79	21·22	26·99	28·32	25·49
Burma {Upper ...	2,981,809	32,885	91	38·00	21·61	30·27	32·03	28·68
Ajmer-Merwara ...	476,912	2,711	176	50·90	47·29	50·08	47·79	52·62

*Includes 16,010 persons enumerated at the Ajodhya fair.

TABLE XV.—*Deaths in Towns and Rural Circles compared.*

Province.	Number of Registration Circles.			Population.			Ratio of deaths per 1,000 of population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Bengal ...	415	131	546	47,291,481	3,230,123	50,521,604	33·45	27·99	33·10
Eastern Bengal and Assam.	264	54	318	29,177,017	635,718	29,812,735	33·93	23·23	33·71
United Provinces of Agra and Oudh.	764	421	1,185	44,326,263*	3,365,519	47,691,782*	38·55	40·17	38·67
Punjab	408	132	540	18,144,935	1,963,755	20,108,690	33·16	34·42	33·28
North-West Frontier Province.	65	13	78	1,724,302	183,882	1,908,184	26·97	25·71	26·85
Central Provinces and Berar.	361	107	468	10,726,650	1,243,551	11,970,201	45·03	43·57	44·88
Madras Presidency...	200	232	432	32,477,725	4,265,178	36,742,903	24·1	28·9	24·7
Coorg	5	5	10	165,358	15,249	180,607	36·48	51·80	37·77
Bombay Presidency	224	65	289	16,027,055	2,653,369†	18,481,362	29·03	35·69	30·30
Burma {Lower ...	225	39	264	4,856,185	705,759	5,561,944	25·39	38·01	26·99
Burma {Upper ...	120	17	137	2,652,040	329,769	2,981,809	29·17	39·09	30·27
Ajmer-Merwara ...	17	6	23	347,280	129,632	476,912	51·52	46·22	50·08

* Includes 16,010 persons enumerated at the Ajodhya fair.

† Includes a population of 959,537 for Bombay City according to Census of 1906 instead of 760,475 according to Census of 1901.

TABLE XVI.—*Deaths according to age.*

Province.	Ratio per 1,000 of Population.																			
	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Bengal ...	200·11*	183·19*	51·91	47·07	20·91	17·77	14·29	12·47	15·22	14·85	18·68	17·75	21·95	19·48	26·44	21·09	40·91	36·39	84·59	68·17
Eastern Bengal and Assam.	204·86	189·32	47·66	42·24	19·80	15·56	13·70	12·53	20·18	23·89	20·48	25·06	23·33	25·50	28·82	26·72	44·07	39·34	75·29	58·71
United Provinces of Agra and Oudh.	232·94	221·22	53·92	54·13	19·93	19·86	13·26	13·63	15·34	17·72	20·43	21·66	25·07	24·65	35·63	31·28	55·46	47·88	91·87	73·53
Punjab ...	199·38	200·35	41·90	43·64	13·32	15·96	12·29	17·77	14·45	17·63	16·78	19·20	18·91	22·00	26·16	26·73	35·98	36·13	74·49	74·05
North-West Frontier Province.	181·1	175·0	34·4	32·0	11·5	10·6	8·9	10·2	9·6	10·5	11·1	13·8	14·7	17·6	21·4	24·2	32·5	36·0	59·4	62·6
Central Provinces and Berar.	290·53	260·69	...	...	...	...	...	Information not available			...	...	...	...	...	...	...	...	...	...
Madras Presidency.	199·61	180·78	33·5	32·0	8·6	8·4	5·9	6·0	9·5	12·7	11·5	11·9	13·0	12·0	19·6	15·5	32·5	27·1	81·4	75·1
Coorg ...	343·75	290·88	70·93	71·51	15·92	12·86	9·17	9·05	14·06	18·97	21·42	30·95	30·00	31·07	43·53	39·71	59·43	45·96	107·12	95·00
Bombay Presidency.	210·82	194·08	66·30	64·48	10·12	10·89	6·56	7·91	11·29	13·75	13·32	15·08	15·34	15·10	22·58	17·00	37·57	29·16	92·91	83·56
Burma { Lower	244·54	192·14	26·81	23·76	12·97	11·70	9·78	8·51	13·73	11·44	13·86	14·41	18·11	19·17	24·41	21·69	31·08	25·19	73·88	70·65
Burma { Upper	276·24	239·15	34·15	33·22	13·56	13·43	9·37	8·55	12·76	11·17	11·89	12·11	14·70	15·46	19·55	15·92	27·52	22·78	77·35	68·50
Ajmer-Merwara.	245·05	252·07	112·29	116·05	21·39	22·65	15·18	19·07	26·42	33·57	29·24	37·27	35·57	40·70	41·64	39·94	70·50	64·61	94·26	91·44
Total ...	217·21	201·17	47·70	45·34	16·45	15·15	11·42	11·41	14·46	16·53	17·30	18·44	20·24	19·84	27·24	23·41	42·07	36·70	83·32	71·50

* Calculated on the number of births during 1910.

NOTE.—The total ratios for India under the age periods "1—5" to "60 years and upwards" exclude Central Provinces and Berar and Ajmer-Merwara, for which the age distribution of the population is not known.

TABLE XVII.—*Deaths according to cause.*

Province.	Deaths per 1,000 of Population in 1910.								All causes.	Ratio of deaths in 1909.	Ratio of deaths in 1908.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Bengal	3·21	·14	·92	20·42	·90	·30	·50	6·67	33·10	30·55	38·56
Eastern Bengal and Assam	3·95	·35	·001	23·31	·85	·15	·40	4·66	33·71	33·89	30·74
United Provinces of Agra and Oudh	2·15	·02	3·31	27·07	·38	·45	·52	4·77	38·67	37·34	52·73
Punjab	0·11	0·15	6·74	17·10	0·50	2·34	0·35	5·99	33·28	30·89	50·73
North-West Frontier Province	0·84	0·43	0·02	19·53	0·23	0·95	0·40	4·45	26·85	26·57	35·83
Central Provinces and Berar	·44	·23	2·42	21·43	4·45	3·48	·56	11·87	44·88	33·09	38·12
Madras Presidency	0·9	0·5	0·1	8·7	1·6	1·0	0·3	11·6	24·7	21·8	26·2
Coorg	·31	·25	·05	31·65	1·50	·35	·10	3·54	37·77	28·15	34·94
Bombay Presidency	·20	·25	1·35	14·26	2·52	3·24	·37	8·10	30·30	27·38	27·15
Burma { Lower	·33	·31	·79	9·62	1·22	·84	·37	13·51	26·99	27·70	28·06
Burma { Upper	·06	·03	1·11	8·89	·74	·76	·46	18·21	30·27	34·81	28·52
Ajmer-Merwara	·004	·16	13·67	31·80	·92	·61	·43	2·49	50·08	50·94	40·03

TABLE XVIII.—*Total number of deaths by months.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	RATIO PER 1,000 OF POPULATION. 1910.	1909.
Bengal ...	127,435	113,118	135,165	114,162	126,134	106,495	145,000	197,067	141,638	142,583	169,116	154,727	1,672,640	33·10	30·55
Eastern Bengal and Assam.	107,657	66,705	72,602	75,249	85,298	60,199	55,744	70,879	69,325	99,410	124,750	117,178	1,004,996	33·71	33·89
United Provinces of Agra and Oudh.	162,879	153,301	165,421	155,121	157,128	144,939	148,444	138,620	134,882	158,423	156,588	168,432	1,844,178	38·67	37·34
Punjab ...	55,163	56,350	79,222	85,284	71,221	45,540	35,339	36,814	41,911	50,357	54,429	57,609	669,239	33·28	30·89
North-West Frontier Province.	5,443	4,219	3,598	3,663	3,131	3,549	3,542	4,110	4,644	4,839	4,920	5,583	51,241	26·85	26·57
Central Provinces and Berar.	35,223	36,058	36,480	35,848	43,782	37,021	39,598	55,240	59,843	59,100	53,132	45,927	537,252	44·88	33·09
Madras Presidency.	74,448	66,822	63,698	61,340	67,187	65,768	76,127	84,428	83,103	77,367	85,251	101,883	907,422	24·7	21·8
Coorg ...	516	455	464	474	671	932	841	629	514	474	374	478	6,822	37·77	28·15
Bombay Presidency.	41,35	38,894	43,920	42,875	43,897	41,123	52,326	57,040	50,886	50,074	48,966	48,867	560,003	30·30	27·38
Burma Lower	14,676	11,427	11,143	11,168	10,619	11,948	13,555	14,160	12,902	12,784	12,937	12,790	150,109	26·99	27·70
Burma Upper	8,652	6,747	6,432	5,793	5,764	6,849	8,228	7,977	7,591	7,680	8,958	9,579	90,250	30·27	34·81
Ajmer-Merwara.	3,564	3,729	3,937	2,107	1,248	856	1,096	1,490	1,530	1,229	1,324	1,772	23,882	50·08	50·94
Total ...	636,791	557,825	622,082	593,084	616,080	525,219	579,840	668,454	608,769	664,320	720,745	724,825	7,518,034	33·20	30·91

TABLE XIX.—*Ratio of deaths from all causes according to months.*

Province.	ANNUAL* DEATH RATE PER MILLE FOR THE MONTH OF January.	February.	March.	April.	May.	June.	July.	August.	September.	October	November.	December.	Ratio for the year.
Bengal	29·70	29·19	31·50	27·49	29·40	25·65	33·79	45·93	34·11	33·23	40·73	36·06	33·10
Eastern Bengal and Assam ...	42·52	29·17	28·67	30 71	33·69	24·57	22·02	27·99	28·29	39·26	50·91	46·28	33·71
United Provinces of Agra and Oudh ...	40·21	41·90	40·84	39·57	38·79	36·98	36·65	34·22	34·41	39·11	39·95	41·58	38·67
Punjab	32·30	36·53	46·39	51·60	41·70	27·55	20·69	21·56	25·36	29·49	32·93	33·73	33·28
North-West Frontier Province ...	33·59	28·82	22·20	23·36	19·32	22·63	21·86	25·36	29·61	29·86	31·37	34·45	26·85
Central Provinces and Berar ...	34·65	39·27	35·88	36·44	43·07	37·63	38·95	54·34	60·83	58·13	54·00	45·17	44·88
Madras Presidency	23·86	23·71	20·41	20·31	21·53	21·78	24·39	27·05	27·52	24·79	28·23	32·65	24·7
Coorg	33·64	32·84	30·25	31·93	43·74	62·78	54·83	41·01	34·63	30·90	25·19	31·16	37·77
Bombay Presidency	26·21	27·43	27·98	28·23	27·97	27·07	33·34	36·34	33·50	31·90	32·24	31·13	30·30
Burma ... Lower	31·07	26·78	23·59	24·43	22·48	26·14	28·69	29·98	28·22	27·06	28·30	27·08	26·99
Burma ... Upper	34·16	29·50	25·40	23·64	22·76	27·95	32·49	31·50	30·97	30·33	36·55	37·82	30·27
Ajmer-Merwara	87·99	101·93	97·20	53·75	30·81	21·84	27·06	36·79	39·03	30·34	33·78	43·75	50·08
India	33·11	32·11	32·35	31·87	32·03	28·22	30·15	34·76	32·71	34·54	38·73	37·69	33·20

* The ratios in this statement have been calculated with reference to the number of days in each month.

TABLE XX.—*Deaths from CHOLERA in the different provinces in India from 1879 to 1910.*

YEAR.	* Bengal.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.-W. Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1879	130,363	17,415	35,892	26,135	...	27,575	223	13,296	...	6,937	1,828	...	120	918	2,734	6	14
1880	39,643	2,083	71,546	274	...	330	1	613	...	684	2,638	...	3	...	299	...	25
1881	79,180	5,010	25,865	5,207	...	9,140	3,404	9,446	3	16,694	5,239	...	16	197	581	1,721	25
1882	182,352	21,055	89,372	39	...	11,932	3,573	23,604	31	7,904	7,177	...	289	1,327	1,562	150	893
1883	90,439	14,908	18,160	190	...	16,235	27,897	36,284	...	37,954	2,185	...	87	797	1,740	1,947	124
1884	134,421	22,276	30,143	614	...	149	87	75,476	...	13,804	5,515	...	227	1,297	1,018	2,479	330
1885	173,767	7,753	63,457	1,936	...	21,868	3,683	58,109	...	37,287	7,685	...	100	1,615	4,624	1,387	2,677
1886	118,368	20,188	34,565	12	...	16,679	976	12,417	...	167	4,027	...	765	173	290	499	10
1887	172,578	7,941	200,628	8,804	...	12,576	14,396	28,359	3	25,711	2,649	...	384	2,612	8,868	2,831	832
1888	111,391	9,693	18,704	14,938	...	921	305	58,677	2	36,500	15,982	...	13	32	191	2,057	1,015
1889	171,103	18,288	48,494	2,838	...	52,588	10,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	145,885	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	229,575	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	259,398	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	126,976	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	236,150	13,497	178,079	113	...	7,043	3,452	42,289	8	33,588	7,428	...	...	2	5,210	1,862	328
1895	177,087	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	226,824	17,042	69,147	5,146	...	52,985	12,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	196,247	33,240	44,208	622	...	57,131	10,122	143,445	106	57,109	8,538	...	19	1,496	13,202	1,039	4,248
1898	65,020	11,149	2,508	33§	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	107,678	8,380	8,142	1,816	...	76‖	541	29,082	...	8,579	4,942	2,059	1	498	...	...	123
1900	345,878	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	110,753	7,468	53,995	180	117	49	17	81,370	58	13,600	3,552	‡	50	6	72	1	11,351
1902	150,971	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	203,405	8,360	47,159	14,688	1,354	437	....	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	137,701	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	146,339	142,312**	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	192,596	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	205,702	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	413	1	4,972
1908	268,908	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,730	937	2,449
1909	56,711	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	493	1,421	164	1,629
1910	162,611	117,969	102,462	2,131	1,605	5,316	...	32,594	56	3,694	1,834	177	2	8	2,864	2	1,812

* Excluding Calcutta from 1879 to 1892.
† Statistics from 1879 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1879-1900 included in the Punjab.

TABLE XXI.—*Deaths from cholera in British Provinces, by months, during the year 1910.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	RATIO PER 1,000 OF POPULATION. 1910.	1909.
Bengal ...	2,987	2,912	5,973	8,270	7,458	9,437	37,103	41,894	14,375	10,384	11,340	10,478	162,611	3·21	1·12
Eastern Bengal and Assam.	6,314	2,242	4,949	12,575	11,343	4,218	2,370	2,021	4,891	22,081	26,997	17,968	117,969	3·95	2·40
United Provinces of Agra and Oudh.	16	27	120	1,598	11,007	16,429	31,255	17,761	8,395	10,873	4,341	640	102,462	2·15	·46
Punjab ...	...	...	1	20	227	183	211	619	618	245	7	...	2,131	0·11	0·08
North-West Frontier Province.	...	...	...	...	1	26	38	383	654	449	31	23	1,605	0·84	0·07
Central Provinces and Berar.	10	1	1	74	141	275	436	1,610	1,556	1,041	170	1	5,316	·44	0·64
Madras Presidency.	4,195	3,758	1,878	2,662	2,838	2,166	2,374	2,081	1,674	1,097	2,461	5,410	32,594	0·9	1·1
Coorg ...	...	...	...	...	...	...	...	...	9	47	...	...	56	·31	·55
Bombay Presidency.	7	4	7	15	99	539	838	1,021	391	471	207	95	3,694	·20	1·55
Burma { Lower	294	356	312	268	231	113	73	61	26	15	7	78	1,834	·33	·73
Burma { Upper	28	25	11	36	47	19	5	2	...	1	2	1	177	·06	2·46
Ajmere-Merwara.	...	...	...	...	...	...	...	1	1	...	...	...	2	·004	...
Total ...	13,851	9,325	13,252	25,518	33,392	33,405	74,703	67,454	32,590	46,704	45,563	34,694	430,451	1·90	1·05

TABLE XXII.—*Details of the distribution and occurrence of cholera during the year 1910.*

Province.	Mortality in 1910.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Bengal	3·21	3·44	2·90	3·23	13·30	9·50	16·35	August.
Eastern Bengal and Assam ...	3·95	3·07	2·94	3·97	15·80	10·05	14·89	November.
United Provinces of Agra and Oudh ...	2·15	1·67	1·34	2·21	11·16	10·89	23·36	July.
Punjab	0·11	0·21	0·34	0·08	1·07	1·63	4·71	August.
North-West Frontier Province ...	0·84	0·37	0·61	0·87	7·15	2·52	2·59	September.
Central Provinces and Berar ...	·44	1·02	·57	·43	1·78	2·86	24·50	August.
Madras Presidency	0·9	2·3	1·1	0·8	8·04	5·6	28·0	December.
Coorg	·31	·45	...	3·38	0·80	1·46	...	October.
Bombay Presidency	·20	·97	·27	·18	1·85	1·37	6·14	August.
Burma { Lower	·33	1·09	·73	·27	1·86	·98	7·91	February.
Burma { Upper	·06	·99	·20	·04	0·27	·19	2·40	April.
Ajmere-Merwara	·004	·12	·02	...	0·27	...	·05	August and September.

TABLE XXIII.—*Small-pox mortality.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :													
A.—Deaths by months													
January	709	1,113	67	134	71	177	1,618	...	271	79	...	2	4,241
February	735	1,056	38	166	85	218	2,022	8	469	148	...	6	4,951
March	1,257	1,651	61	283	71	475	2,263	11	899	324	3	9	7,317
April	1,190	1,541	115	437	92	442	1,872	7	832	305	8	22	6,863
May	1,275	1,851	99	493	80	495	1,621	7	705	232	15	9	6,982
June	804	1,161	127	469	94	421	1,341	2	369	151	11	4	4,954
July	425	502	124	254	80	198	1,535	6	271	138	13	3	3,519
August	308	475	81	189	61	124	1,477	2	193	86	7	3	3,006
September	149	349	27	132	25	74	1,427	1	132	63	3	...	2,382
October	96	253	27	108	36	38	1,228	...	86	48	11	...	1,931
November	140	263	36	132	51	50	1,246	1	129	58	4	5	2,115
December	242	405	71	222	114	82	1,548	1	244	109	1	15	3,054
Total ...	7,440	10,620	873	3,019	830	2,794	19,198	46	4,600	1,741	76	78	51,315
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1910	·14	·35	·02	0·15	0·43	·23	0·5	·25	·25	·31	·03	·16	0·23
Ratio per 1,000 of population, 1909...	·76	·79	·12	0·17	0·32	0·35	0·5	·03	·27	·15	·06	·03	·45
Difference ...	—·62	—·44	—·10	—0·02	+·11	—0·12	...	+·22	—·2	+·16	—·3	+·13	—0·22
Mean ratio per 1,000 during 1905-09	·52	·35	·44	0·61	0·40	·59	0·6	·69	·33	·60	·22	·81	0·49
Difference ...	—·38	...	—·42	—·46	+·03	—·36	—·1	—·44	—·8	—·29	—·19	—·65	—·26
II.—District mortality excluding Towns : —													
Number of districts affected ...	32	22	36	28	5	24	23	5	24	15	7	7	228
Highest district ratio	·67	3·94	·11	0·77	2·00	·59	1·6	·32	·89	·69	·06	2·07	3·94
Name of that district	Bankura	Nowgong	Ghazipur	Mianwali	Dera Ismail Khan.	Raipur	Bellary	Mercara	Kolaba	Pegu ...	Shwebo	Dewair	Nowgong.
Lowest district ratio	·01	·01	0·0009	0·004	0·06	0·003	0·1	·08	·01	0·002	0·003	·04	0·0009
Name of that district	Puri ...	Chittagong.	Aligarh	Gujranwala.	Hazara	Seoni ...	Tinnevelly	Padinalknad.	Belgaum	Henzada	Lower Chindwin.	Masuda	Aligarh.
Number of districts without mortality.	*Nil*	*Nil*	12	1	*Nil*	*Nil*	*Nil*	*Nil*	1	3	4	10	31
District death rate per 1,000 of population.	·14	·35	·01	0·15	0·40	·22	0·5	·18	·16	·21	·01	·21	0·21
III.—Town mortality :—													
Number of towns affected ...	59	22	40	61	7	45	90	3	30	24	5	3	389
Highest town ratio	7·61	21·17	·57	4·07	5·36	7·47	12·3	4·58	5·13	8·42	1·72	·42	21·17
Name of that town	Bankura	Nawabganj.	Bareilly	Sangla	Bannu	Barsi-Takli.	Mangalore.	Somwarpet.	Karwar	Wakima	Yamethin.	Kekri Town.	Nawabganj.
Lowest town ratio	·02	·04	·01	0·01	0·04	·02	0·03	·30	0·02	0·13	·05	·05	·01
Name of that town	Cossipore Chitpur.	Sirajganj.	Lucknow	Delhi	Dera Ismail Khan.	Nagpur	Ellore ...	Mercara	Broach	Nyaunglebin.	Mandalay	Ajmer Suburb.	Lucknow.
Number of towns without mortality	72	32	65	71	6	62	142	2	35	15	12	3	517
Town death rate per 1,000 of population.	·17	·51	·05	0·18	0·80	·32	0·6	1·05	·77	1·02	·12	·05	0·39
IV.—Infantile mortality :—													
Children under one year... ...	947	1,779	220	490	165	938	6,439	...	1,220	82	3	22	12,305
Children, 1—10 years	2,222	3,745	498	1,869	546	1,328	5,444	...	1,854	323	2	51	17,881
Percentage of children in total small-pox mortality.	42·59	52·02	82·25	78·14	85·66	81·10	61·90	...	66·83	23·26	6·58	93·59	58·83

TABLE XXIV.—*Fever mortality.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	82,673	81,120	113,980	32,404	4,250	13,665	25,276	420	20,492	6,204	2,622	1,841	384,947
February	69,144	51,208	100,542	28,641	3,163	14,334	22,977	381	19,102	4,028	1,710	1,537	316,767
March	80,237	53,554	103,006	29,667	2,665	15,927	22,365	380	21,715	3,567	1,746	1,644	336,473
April	70,706	49,210	111,296	27,658	2,750	18,624	21,472	402	20,777	3,547	1,587	1,186	329,215
May	83,158	59,035	120,342	30,871	2,279	24,354	23,741	564	21,069	3,539	1,547	1,007	371,498
June	66,838	43,677	107,863	28,174	2,555	19,517	22,876	795	18,720	4,269	1,934	732	317,950
July	74,177	41,728	93,537	21,698	2,495	19,000	26,484	735	23,072	4,903	2,342	940	311,111
August	108,026	54,553	92,535	21,243	2,603	25,177	31,089	530	24,570	4,964	2,278	1,265	368,834
September	89,042	49,775	96,573	24,764	3,027	27,839	30,945	430	22,463	4,547	2,211	1,309	352,925
October	93,602	59,818	113,208	31,329	3,326	29,244	28,616	368	23,219	4,116	2,280	1,033	390,159
November	114,978	75,147	115,699	33,243	3,799	26,596	30,133	317	24,570	4,800	3,033	1,122	433,437
December	99,348	76,146	122,424	34,233	4,356	22,215	35,407	395	23,754	5,025	3,225	1,550	428,078
Total ...	1,031,929	694,971	1,291,006	343,925	37,268	256,492	321,381	5,717	263,523	53,499	26,515	15,166	4,341,392
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1910...	20·42	23·31	27·07	17·10	19·53	21·43	8·7	31·65	14·26	9·62	8·89	31·80	19·17
Ratio per 1,000 of population, 1909...	20·90	24·56	30·94	20·40	20·65	15·08	7·3	22·77	12·11	9·44	9·47	33·15	19·82
Difference ...	—·48	—1·25	—3·87	—3·30	—1·12	+6·35	+1·4	+8·88	+2·15	+0·18	—·58	—1·35	—·65
Mean ratio per 1,000 during 1905-1909...	22·79	22·69	31·02	22·78	24·71	17·45	7·7	24·53	13·50	9·62	7·88	26·93	20·56
Difference ...	—2·37	+·62	—3·95	—5·68	—5·18	+3·98	+1·0	+2·12	+·76	...	+1·01	+4·87	—1·39
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	24	23	5	25	18	11	17	259
Highest district ratio	31·60	36·16	36·27	27·79	24·08	35·73	23·9	39·96	29·31	20·57	15·90	53·20	53·20
Name of that district	Shahabad	Jalpaiguri	Futrukhabad.	Muzaffargarh.	Kohat.	Burhanpur.	Cuddapah	Nanjarajapatna.	Broach.	Thayetmyo.	Mandalay.	Nasirabad Rural Distr ct.	Nasirabad Rural District.
Lowest district ratio	8·98	11·18	17·78	4·38	17·78	8·95	3·0	26·09	5·18	2·80	4·65	26·10	2·80
Name of that district	Howrah.	Sibsagar.	Garhwal.	Simla.	Bannu.	Buldana	Coimbatore.	Yedenalknad.	Belgaum.	Maubin.	Meiktila.	Pisangan Rural District	Maubin.
Number of districts without mortality.	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*
District death rate per 1,000 of population.	21·14	23·55	27·38	17·26	20·14	22·59	9·1	32·53	15·09	10·37	9·65	35·58	19·84
III.—Town mortality :—													
Number of towns affected ...	131	54	105	132	13	107	229	5	65	39	17	6	903
Highest town ratio	33·53	31·93	45·23	36·91	26·98	36·08	17·6	37·50	25·31	19·34	7·39	46·15	46·15
Name of that town	Kot Chandpur.	Nawabganj.	Shikarpur	Faridabad	Nawashar (notified area.)	Saoner.	Srangavarapukota.	Fraserpet.	Umar Kot.	Pyapon.	Yenangaung.	Beawar Town.	Beawar Town.
Lowest town ratio	2·26	3·54	5·24	1·31	1·36	1·58	0·1	3·55	1·30	1·51	·62	8·62	0·1
Name of that town	Dumraon.	Mymensingh.	Meerut.	Khangah Dogran.	Tank (notified area.)	Khamgoan.	Dharapuram.	Somwarpet.	Bijapur.	Moulmein	Myngyan	Nasirabad Town.	Dharapuram.
Number of towns without mortality	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	3	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	3
Town death rate per 1,000 of population.	9·92	11·92	23·01	15·63	13·80	11·43	5·7	22·10	8·16	4·42	2·83	21·66	11·62

TABLE XXV.—*Dysentery and Diarrhœa mortality.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	3,179	2,070	916	557	17	2,071	4,329	9	2,157	494	144	32	15,975
February	3,011	1,018	811	443	27	2,064	3,865	12	1,880	429	109	29	13,698
March	3,324	1,217	969	495	21	2,116	3,648	8	2,039	421	97	35	14,390
April	3,015	1,620	1,308	623	27	2,738	3,580	18	2,316	550	142	41	15,978
May.	3,807	2,184	1,600	891	28	3,377	3,828	50	2,765	626	147	36	19,339
June	3,686	2,039	1,763	902	34	3,083	4,255	50	3,664	816	280	15	20,587
July	4,459	1,934	1,916	796	28	4,900	5,683	33	6,622	823	385	40	27,619
August	6,468	1,974	2,276	982	60	8,861	6,891	35	8,191	781	319	70	36,908
September	4,162	2,068	1,710	1,136	71	9,181	5,930	22	6,286	527	172	63	31,328
October	3,417	2,622	1,760	1,163	69	6,757	5,168	12	4,411	449	156	24	26,008
November	3,563	3,639	1,523	1,090	37	4,638	5,002	9	3,512	426	139	22	23,600
December	3,811	3,171	1,448	962	24	3,490	5,938	13	2,800	425	130	30	22,242
Total ...	45,902	25,556	18,000	10,040	443	53,276	58,117	271	46,643	6,767	2,220	437	267,672
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1910	·90	·85	·38	0·50	0·23	4·45	1·6	1·50	2·52	1·22	·74	·92	1·18
Ratio per 1,000 of population, 1909	·71	·87	·30	0·52	0·21	2·79	1·3	1·04	1·90	1·65	1·08	1·13	·96
Difference ...	+·19	−·2	+·8	−·02	+·02	+1·66	+·3	+·46	+·62	−·43	−·34	−·21	+·22
Mean ratio per 1,000 during 1905-1909 ...	·97	·83	·46	0·78	0·25	3·33	1·6	1·34	2·67	1·62	·67	1·15	1·19
Difference ...	−·07	+·2	−·8	−·28	−·02	+1·12	...	+·26	−·15	+·40	+·7	−·23	−·01
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	24	23	5	25	18	11	7	249
Highest district ratio	5·69	6·83	7·24	2·38	0·43	15·27	4·5	3·08	7·83	1·82	2·03	·64	15·27
Name of that district	Puri.	Lakhimpur.	Garhwal	Simla.	Dera Ismail Khan.	Akola.	Nilgiris.	Kiggatnad	Ahmednagar.	Bassein.	Pakokku.	Dewair.	Akola.
Lowest district ratio	·04	·06	·01	0·05	0·02	·32	0·4	·16	·05	·27	·14	·02	·01
Name of that district	Champaran.	Dinajpur.	Bulandshahr.	Hoshiarpur.	Peshawar.	Bhandara	Vizagapatam.	Nanjarajpatna.	Upper Sind Frontier.	Toungoo.	Kyaukse.	Bhinai.	Bulundshahr.
Number of districts without mortality.	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	10	10
District death rate per 1,000 of population.	·80	·83	·27	0·38	0·18	4·47	1·3	·97	2·41	·93	·68	·07	1·04
III.—Town mortality :—													
Number of towns affected ...	122	52	93	125	11	106	211	3	63	38	16	4	844
Highest town ratio	9·15	16·47	6·32	5·32	2·06	14·79	15·1	16·81	10·26	8·07	3·70	6·02	16·81
Name of that town	Kamarhati.	Nowgong.	Hathras.	Kalabagh.	Abbottabad.	Amraoti.	Palamcottah.	Virajendrapet.	Athin.	Myaungmya.	Yenangyaung.	Ajmer Suburb.	Virajendrapet.
Lowest town ratio	·09	·10	·05	0·16	0·31	·18	0·1	2·87	·07	·28	·12	·14	0·1
Name of that town	Satkhira.	Pubna.	Kanauj.	Dasuya.	Nowshera	Ratanpur.	Palkonda.	Somwarpet.	Larkhana.	Thaton.	Yamethin	Kokri-Town.	Palkonda.
Number of towns without mortality.	9	2	12	7	2	1	21	2	2	1	1	2	62
Town death rate per 1,000 of population.	2·39	1·75	1·83	1·59	0·75	4·29	3·7	7·28	3·04	3·19	1·26	3·18	2·70

TABLE XXVI.—*Plague mortality.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL. 1910.	TOTAL. 1909.
BRITISH PROVINCES.														
Bengal	6,406	9,929	14,915	5,381	998	183	167	328	527	499	2,032	5,219	46,584	11,779
Eastern Bengal and Assam	1	...	...	...	...	41	4	...	...	...	...	...	46	1
United Provinces of Agra and Oudh.	27,125	33,175	43,037	21,585	5,817	373	213	496	640	1,430	6,974	17,209	158,074	38,394
Punjab	6,724	13,827	34,767	43,236	24,034	2,363	157	151	388	1,463	3,289	5,084	135,483	35,655
North-West Frontier Province.	...	...	...	...	...	...	...	...	...	...	5	25	30	1
Central Provinces and Berar	5,901	6,526	4,572	841	92	73	138	743	1,720	2,294	3,149	2,912	28,961	19,816
Madras Presidency ...	242	141	70	34	40	99	151	279	434	414	1,397	1,566	4,867	3,844
Coorg	...	...	...	...	...	...	...	...	...	1	1	7	9	2
Bombay Presidency ...	2,325	3,048	3,091	1,920	1,330	595	730	1,294	1,869	2,476	2,875	3,498	25,043	24,319
Burma { Lower ...	248	561	1,003	952	466	454	299	136	63	52	46	137	4,417	3,365
Burma { Upper ...	619	746	686	199	26	15	28	43	68	83	266	545	3,324	3,581
Ajmer-Merwara ...	1,499	2,001	2,078	702	83	...	...	24	48	49	28	5	6,517	5,176
TOTAL { 1910 ...	51,091	69,954	1,04,219	74,850	32,886	4,196	1,887	3,494	5,748	8,761	20,062	36,207	413,355	...
TOTAL { 1909 ...	8,371	11,317	18,473	16,179	12,953	2,483	2,381	5,200	9,273	14,309	15,658	28,734	...	145,333
NATIVE STATES, ETC.														
Eastern Bengal and Assam Native States.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh Native States.	...	...	...	11	5	...	...	...	...	...	18	177	211	...
Punjab Native States ...	2,287	3,250	8,779	8,211	8,866	653	101	17	161	296	681	1,036	34,338	9,409
Jammu and Kashmir States	25	25	137	71	24	...	...	...	...	22	9	26	339	156
Baluchistan	...	...	7	14	...	...	...	...	...	...	...	...	21	1
Rajputana	1,582	4,639	7,638	8,659	2,557	355	314	433	1,645	2,570	2,244	1,922	34,578	6,984
Central India	300	360	517	241	22	11	35	332	806	1,049	951	1,459	6,083	3,533
Native States in Central Provinces	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Bombay Presidency Native States.	1,000	1,182	1,124	706	134	59	170	851	1,765	1,748	1,381	1,050	11,170	8,282
Hyderabad State. ...	51	235	59	14	65	6	115	632	508	928	1,455	1,298	5,366	493
Mysore	253	175	100	66	14	66	227	258	821	1,233	1,578	1,547	6,338	4,048
Bangalore, Civil and Military Station.	43	51	47	29	22	19	19	54	84	139	190	107	804	562
Madras Native States ...	...	...	...	...	...	...	...	...	...	...	1	1	*2	3
TOTAL { 1910 ...	5,541	9,917	18,428	18,022	11,709	1,169	981	2,577	5,790	7,985	8,508	8,623	99,250	...
TOTAL { 1909 ...	2,679	2,816	3,885	2,907	2,750	824	478	1,463	3,530	4,424	3,788	3,931	...	33,475
GRAND TOTAL { 1910 ...	56,632	79,871	122,647	92,872	44,595	5,365	2,868	6,071	11,538	16,746	28,570	44,830	512,605	...
GRAND TOTAL { 1909 ...	11,050	14,133	22,358	19,086	15,703	3,309	2,859	6,663	12,803	18,733	19,446	32,665	...	178,808
Calcutta City	35	66	195	276	300	121	72	36	27	36	39	59	1,262	2,117
Bombay City	85	292	695	913	830	280	224	130	54	61	45	32	3,641	5,186
Madras City	...	...	...	...	...	1	...	...	...	1	2	1	5	3

* Suspected cases of plague.

TABLE XXVII.—*Mortality from Respiratory Diseases.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces:—													
A.—Deaths by months—													
January	1,638	429	1,741	4,302	145	3,141	2,931	4	4,793	471	199	62	19,856
February	1,510	394	1,924	4,104	149	3,395	2,569	5	4,751	373	212	35	19,421
March	1,573	390	1,920	4,474	149	3,449	2,515	8	5,113	417	215	43	20,266
April	1,178	286	1,978	4,134	133	3,334	2,450	2	4,781	346	134	29	18,785
May	1,183	308	1,775	4,226	133	3,451	2,455	4	4,389	335	132	11	18,402
June	965	309	1,467	3,652	120	2,627	2,597	10	4,118	348	163	6	16,382
July	1,053	302	1,572	2,899	120	2,849	2,883	6	5,148	401	169	19	17,421
August	1,342	371	1,536	3,062	133	3,423	3,011	5	5,449	377	203	17	18,929
September	1,025	381	1,512	3,290	133	3,648	3,254	3	5,294	374	190	8	19,112
October	1,059	420	1,751	3,682	179	3,969	3,215	9	5,328	430	218	6	20,266
November	1,316	498	2,047	4,217	178	4,223	3,437	1	5,194	378	209	21	21,719
December	1,605	557	2,366	4,957	234	4,146	3,701	6	5,522	395	224	36	23,749
Total ...	15,447	4,645	21,589	46,999	1,806	41,655	35,018	63	59,880	4,645	2,268	293	234,308
B.—Annual death ratios:—													
Ratio per 1,000 of population, 1910...	·30	·15	·45	2·34	0·95	3·48	1·0	·35	3·24	·84	·76	·61	1·03
Ratio per 1,000 of population, 1909	·29	·15	·34	2·22	0·85	2·60	0·8	·33	2·89	1·01	·72	·48	·90
Difference ...	+·01	...	+·11	+·12	+·10	+·88	+·2	+·2	+·35	—·17	+·4	+·13	+·13
Mean ratio per 1,000 during 1905-1909 ...	·27	·10	·43	2·91	0·83	2·80	0·7	·25	3·04	·82	·72	·74	0·93
Difference ...	+·03	+·5	—·2	—·57	+·12	+·68	+·3	+·10	+·20	+·2	+·4	—·13	+·10
II.—District mortality excluding towns:—													
Number of districts affected ...	32	22	48	29	5	24	23	3	24	18	11	8	247
Highest district ratio	1·86	2·33	6·16	9·21	1·95	12·00	2·5	·64	9·18	·97	1·01	2·70	12·00
Name of that district	Puri	Lakhimpur.	Hamirpur.	Gurdaspur	Hazara	Saugor	Anantapur.	Yedenalknad.	Kaira	Sandoway	Shwebo	Dewair	Saugor
Lowest district ratio	·002	·006	·01	0·01	·0·14	·22	0·1	·08	·01	·02	·01	·02	·002
Name of that district	Purnea	Chittagong.	Sitapur	Multan	Kohat	Bhandara	Nellore	Kiggatnad	Larkhana	Toungoo	Kyaukse	Bhinai	Purnea
Number of districts without mortality	Nil	Nil	Nil	Nil	Nil	Nil	Nil	2	1	Nil	Nil	9	12
District death rate per 1,000 of population.	·17	·15	·25	2·05	0·70	3·34	0·9	·18	2·44	·84	·31	·12	0·80
III.—Town mortality:—													
Number of towns affected ...	100	33	93	131	12	103	183	1	63	32	17	5	773
Highest town ratio	8·36	3·09	17·22	14·12	6·97	18·80	9·1	4·75	16·89	9·28	13·94	3·47	18·80
Name of that town	Garden Reach.	Jalpaiguri	Benares	Pathankot	Haripur	Khurai	Tenali	Mercara	Ahmedabad.	Toungoo	Myingyan	Nasirabad Town.	Khurai
Lowest town ratio	·04	·04	·05	0·19	0·33	·16	0·03	4·75	0·14	·07	·31	·14	0·03
Name of that town	Sasaram	Narayangunj.	Mainpuri	Khangah Dogran.	Kulachi	Wun	Muslipatam.	Mercara	Dohad	Pegu	Pokokku	Kekri Town.	Muslipatam.
Number of towns without mortality	31	21	12	1		4	49	4	2	7	Nil	1	133
Town death rate per 1,000 of population.	2·23	·37	3·12	4·98	3·22	4·70	1·7	2·10	7·83	4·25	4·40	1·95	3·58

TABLE XXVIII.—*Vaccination.*

A.—Total Primary vaccinations and re-vaccinations, successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1910-11.

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of persons vaccinated by each vaccinator of the Special Staff.	Total cost of the Special Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccination.	Primary.	Re-vaccination.	Under one year.	1 to 6 years			
								Rs.	Rs. A. P.
Bengal	1,929,222	105,908	99·07	62·06	1,006,829	797,205	1,063†	1,68,436¶	0 1 5
Eastern Bengal and Assam ...	1,288,134	96,854	96·49	67·12	350,802	737,535	1,185	1,16,702	0 1 6
United Provinces of Agra and Oudh	1,343,397	80,835	97·74	79·13	896,165	355,555	1,526	1,69,758	0 2 0
Punjab	636,697	128,378	97·20	73·21	498,633	91,610	2,845‡	1,21,076	0 2 10
North-West Frontier Province ...	99,719	7,847	99·06	72·95	59,863	22,214	3,065‖	14,266	0 2 3
Central Provinces and Berar ...	581,106	73,008	98·71	73·92	444,732	110,226	1,915	68,684	0 1 10
Madras	1,368,173	178,011	87·57	72·41	540,765	478,233	1,797§	2,90,102	0 4 2
Coorg	9,360	6,794	93·79	72·69	650	4,145	1,750	2,235	0 3 5
Bombay	661,911	59,408	98·76	61·34	485,009	106,807	1,629	3,56,870	0 9 3
Burma	355,781	57,245	95·50	67·60	83,623	170,980	1,466	193,279	0 9 1
Ajmer-Merwara	13,100	306	97·49	90·10	9,767	2,596	881	3,115	0 3 11
Total ...	8,286,600	794,594	96·24	70·40	4,376,838	2,877,106	1,467	15,04,523	0 3 0

* Excluding those the results of which were not known.
† The figure 1,072 in the provincial report has been calculated on the total number of operations performed.
‡ Including vaccinations performed in Cantonments.
§ Excludes average of work done by each medical subordinate.
‖ Including vaccinations performed in Cantonments and Political Agencies.
¶ The total cost, Rs. 1,90,937, shown in Statement II of the provincial report includes the cost of dispensaries.

B.—Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1910-11.

Province.	Population.	NUMBER OF OPERATIONS PERFORMED (PRIMARY AND RE-VACCINATIONS COMBINED).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	DEATHS FROM SMALL-POX*.	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Bengal	48,472,267	1,920,391	114,739	2,035,130	40·61	51·93	7,440	·14
Eastern Bengal and Assam	30,961,459	1,382,057	2,931	1,384,988	41·62	28·33	1062 0	·35
United Provinces of Agra and Oudh ...	47,691,782	1,423,953	279	1,424,232	28·42	46·98	873	·02
Punjab	20,296,870	764,274	801	765,075	33·25	61·42	3,019	0·15
North-West Frontier Province ...	2,162,407	107,415	151	107,566	46·55	69·21	830	0·43
Central Provinces and Berar	13,601,341	648,262	5,852	654,114	45·08	81·74	2,794	·23
Madras	38,255,733†	1,546,167	17	1,546,184	32·90	35·34	19,198	0·5
Coorg	180,607	15,868	286	16,154	73·56	9·00	46	·25
Bombay	21,438,769	716,835	4,484	721,319	28·94	56·56	4,600	·25
Burma	12,057,905‡	394,893	18,133	413,026	29·36	17·34	1,817	·21
Ajmer-Merwara	476,912	13,406	.....	13,406	26·73	51·20	78	·16
Total ...	235,596,052	8,933,521	147,673	9,081,194	35·06	46·44	51,315	·23

*For the Calendar year, from the Provincial Sanitary reports.
†Excludes the population of the Cantonments of Bangalore and Secunderabad.
‡Census population of 1911.

EAST INDIA (SANITARY MEASURES).

REPORT

ON

SANITARY MEASURES IN INDIA

1911–1912.

VOL. XLV.

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TABLE OF CONTENTS.

SECTION I.

EUROPEAN ARMY OF INDIA.

PARA.		PAGE.
1.	India	1
2.	Northern and Southern Armies, Divisions, Stations ...	1
3.	Geographical groups	2
4.	Cholera	2
5.	Small-pox	2
6.	Malaria	2
7.	Enteric fever	3
8.	Pyrexia of uncertain origin	9
9.	Sandfly-fever	10
10.	Plague and some other diseases	10
11.	Tubercle of the lungs	11
12.	Pneumonia	11
13.	Respiratory diseases	11
14.	Dysentery and Diarrhœa	11
15.	Hepatic abscess	11
16.	Venereal diseases	12
17.	Heat Stroke	12
18.	Suicide	12
19.	Invaliding	12
20.	Officers	12
21.	Women	12
22.	Children	13

SECTION II.

INDIAN ARMY.

23.	India	15
24.	Northern and Southern Armies Divisions	16
25.	Geographical groups	16
26.	Stations	16
27.	Cholera	17
28.	Small-pox	17
29.	Malaria	17
30.	Pyrexia of uncertain origin	18
31.	Sandfly-fever	19
32.	Kala Azar, Relapsing fever, Typhus fever	19
33.	Enteric fever	19
34.	Mediterranean fever	19
35.	Plague	19
36.	Scurvy	20
37.	Tubercle of the lungs	20
38.	Pneumonia	20
39.	Dysentery and Diarrhœa	20
40.	Venereal diseases	20
41.	Beri-beri	21
42.	Suicides	21

SECTION III.

GENERAL POPULATION.

PARA.		PAGE.
43.	Meteorology, crops and general conditions	23
44.	Births and deaths	23
45.	Chief diseases	24
46.	Bengal	25
47.	City and Port of Calcutta	25
48.	Eastern Bengal and Assam	25
49.	United Provinces	26
50.	Punjab	26
51.	North-West Frontier Province	27
52.	Central Provinces	27
53.	Madras	27
54.	City of Madras	27
55.	Bombay	28
56.	City and Port of Bombay	28
57.	Burma	28
58.	Coorg and Ajmer-Merwara	29
59.	Red Sea Pilgrim Traffic	29

SECTION IV.

JAILS OF INDIA.

60.	India	31
61.	The prison population in 1911. Total sickness and mortality rates	31
62.	Causes of sickness and mortality	31
63.	Malaria	31
64.	Dysentery	32
65.	Tubercle of the lungs	32
66.	Cholera	32
67.	Small-pox, enteric fever	32
68.	Bengal	33
69.	Eastern Bengal and Assam	33
70.	United Provinces	34
71.	Punjab	34
72.	North-West Frontier Province	34
73.	Central Provinces	34
74.	Madras	35
75.	Bombay	35
76.	Burma	36
77.	Andamans	36

SECTION V.

VACCINATION.

78.	Vaccination in India	37
79.	Vaccine Lymph	37
80.	Bengal	38
81.	Eastern Bengal	38
82.	Assam	39
83.	United Provinces	40
84.	Punjab	40

SECTION V—*contd.*

VACCINATION—*contd.*

PARA.		PAGE.
85.	North-West Frontier Province	41
86.	Central Provinces and Berar	42
87.	Madras	43
88.	Coorg	43
89.	Bombay	43
90.	Burma	44
91.	Ajmer-Merwara	45
92.	Vaccination among troops...	45

SECTION VI.

MEDICAL INSTITUTIONS.

A.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private-aided).

93.	India	47
94.	Bengal (excluding Calcutta)	48
95.	Calcutta	48
96.	Eastern Bengal and Assam	48
97.	Central Provinces	48
98.	North-West Frontier Province	48
99.	United Provinces	48
100.	Punjab	48
101.	Burma	49
102.	Madras	49
103.	Bombay	49
104.	Baluchistan	49
105.	*B.— Civil Hospitals and Dispensaries (State Special Railway and private non-aided).*	49
106.	*C.—Lunatic Asylums.*	50
107.	Bengal	51
108.	Eastern Bengal and Assam	51
109.	United Provinces	51
110.	Punjab	51
111.	Central Provinces	51
112.	Bombay	51
113.	Madras	51
114.	Burma	51
	D.—Medical Colleges and Schools.	51
115.	Bengal	51
116.	Eastern Bengal and Assam	52
117.	United Provinces	52
118.	Punjab	52
119.	Burma	52
120.	Madras	52
121.	Bombay	53
122.	The X-Ray Institute of India	53

SECTION VII.

SANITARY WORKS.

PARA.		PAGE.
123.	India	55
124.	Bengal	55
125.	Sanitary Board	56
126.	Eastern Bengal and Assam	56
127.	Sanitary Board	57
128.	United Provinces	57
129.	Sanitary Board	57
130.	Punjab	58
131.	Sanitary Board	58
132.	North-West Frontier Province	59
133.	Central Provinces and Berar	59
134.	Sanitary Board	59
135.	Madras	59
136.	Sanitary Board	60
137.	Bombay	60
138.	Sanitary Board	61
139.	Burma	61
140.	Sanitary Board	61
141.	Military Works	61

SECTION VIII.

GENERAL REMARKS.

142.	Laboratories.	
	Central Research Institute, Kasauli	63
	Bombay Bacteriological Laboratory	64
	King Institute of Preventive Medicine	65
	Pasteur Institute, Kasauli...	66
	Pasteur Institute of Southern India, Coonoor	67
143.	Indian Research Fund Association	67
	Kala Azar	69
	Cholera	69
144.	Yellow fever	69
145.	Malaria	69
146.	Special Enquiries	71
	New Imperial Delhi	71
	Bharatpur City	71
147.	Instruction in Malaria	71
148.	Improvement and strengthening of the Sanitary Services in India.	72
149.	Sanitary Conferences	72
150.	Scientific publications	76

SECTION I.

EUROPEAN ARMY OF INDIA.

1. The average daily strength of the European Army in India during 1911, excluding officers, was 72,371. It is very satisfactory to be able to note that the improvement in health, which has progressed steadily during the past few years, is maintained. With the exception of a slight rise in the death rate from 4·66 per thousand in 1910 to 4·89 in the year under review there was an all round improvement, as is shown in the statement in the margin. The slight rise in death rate was due in the main to heat stroke and cholera, for which the rates rose from 0·10 to 0·33, and from 0·10 to 0·29, respectively. The figure 4·89 however compares very favourably with the death rate of a similar age distribution in European countries. With the exception of sandfly fever and (to an insignificant degree) pneumonia there was a decrease in sickness caused by each of the principal diseases in 1911 as compared with the previous year.

India.

India.	All causes. Ratios per 1,000.		
	1906-1910.	1910.	1911.
Admissions ...	750·9	576·5	524·7
Constantly sick ...	43·1	31·9	28·8
Deaths	7·83	4·66	4·89
Invalids ...	17·17	7·77	7·12

The chief causes of mortality were hepatic abscess, enteric fever, heat-stroke and cholera. It is worthy of note that for the first time on record the death rate from enteric fever, is lower than that of hepatic abscess. Only 24 deaths were recorded from enteric as compared with 46 in 1910, and 113 in 1909. Deaths from heat-stroke numbered 24 as compared with 7 in 1910; this is fully explained by the unusually severe climatic conditions, brought about by the irregularity of the monsoon. From all causes 515 men were invalided as compared with 563 in 1910 and 649 in 1909. Diseases of the ear were the chief cause of this source of loss in 1911, the number so invalided being 62. Tubercle of the lungs took second place, 55 being invalided as compared with 71 in the previous year. Nervous diseases caused 54 invalidings, and mental diseases 40.

2. The relative health of the troops of the Northern and Southern armies is shown in Table II.

Northern and Southern Armies. Divisions, Stations.

The rates of sickness and death were higher in the Northern army than in the Southern; this was due to the greater prevalence of nearly all the principal diseases. Venereal diseases were however more prevalent in the Southern army.

There were decreased admission rates in the Divisions of Peshawar, Lahore, Mhow, Poona, Meerut, Lucknow and Burma. With the exception of the Quetta Division the constantly sick rates were all lower than in the previous year. The death rate was decreased in the Peshawar, Rawalpindi, Lahore and Mhow Divisions.

Cholera increased in the Lucknow, Secunderabad and Meerut Divisions. Enteric fever decreased in all except Peshawar, Quetta and Lucknow. Heat-stroke caused an increased mortality throughout the armies. The death rate from tubercle of the lungs decreased in all Divisions except Lahore where the increase was only 0·02 per thousand.

Nine stations, the same number as last year, form the list of those that, according to the statistical method adopted in this report, are to be regarded as having been especially unhealthy. Full abstracts of the sanitary reports on these stations will be

found in Table IV,* so it is unnecessary to do more than draw attention to them here. As regards the prevalence of important diseases in plains stations where the average annual strength was 500 or more, the incidence of enteric fever was greatest at Bareilly, Lucknow, Belgaum, Fyzabad and Nowshera; of malaria at Bellary, Mhow, Muttra, Peshawar and Jubbulpore; of dysentery at Poona, Bangalore, Fyzabad, Fort William and Lucknow; and of venereal diseases at Colaba, Bellary, Bangalore, Fyzabad and Madras including St. Thomas' Mount.

Geographical Groups.

3. In the tables appended to this report will be found the statistics of European troops compiled according to the areas into which India has been divided from the meteorological and physiographical points of view.

An increased admission rate is shown only in the Burma, Coast and Inland, in the Bengal and Orissa and in the Southern India groups. The death rate rose in the Burma, in the Gangetic Plain, in the North-West Frontier, in the Western Coast, and in the Hill Stations groups.

As in the previous year sickness was most prevalent in the North-West Frontier group, where fevers, respiratory diseases and pneumonia were prevalent. The incidence of enteric fever was highest in the Gangetic Plain and the Deccan. Malaria was most prevalent in Rajputana (Group VIII) and dysentery in Southern India.

The highest death rate in any group was 9·65 per thousand in the Gangetic Plain, the lowest (with the exception of hill stations) was 4·18 in the Deccan.

Cholera.

4. Cholera caused 38 admissions and 21 deaths, as compared with 9 admissions and 7 deaths in 1910. Of these 26 cases with 12 deaths occurred amongst the 1st Royal Scots at Benares. This epidemic broke out simultaneously in three places on the night of the 27th October. The source was traced more or less conclusively to the supply of butter from an infected dairy in the city where the disease was prevalent. The epidemic was confined to British troops and subsided three days later, when precautions had been taken to prevent further extraneous infection.

Seven cases with 4 deaths occurred amongst the 4th King's Royal Rifles, when returning through Dehra Dun from Chakrata. A series of four cases with four deaths occurred in Secunderabad which were traced to bazaar foods. One fatal case occurred at Bareilly.

Small-pox.

5. Only one case of small-pox occurred (at Deolali) during the year as compared with 3 in 1910.

Malaria.

6. The admissions to hospital for malaria numbered 6,527) 90 per thousand) as compared with 9,572 (132 per thousand) in 1910, and the number of cases treated "in barracks" was 801 as compared with 3,316. There were six deaths, and seven invalidings to England.

From Table I to this section it will be seen that the decreased prevalence of malaria was common to nearly all the principal geographical areas of the country, but was somewhat greater in those of the Northern army than in those of the Southern. The autumn of 1911 was no doubt much less malarious than usual, and the year was very healthy throughout the country. Thus both the initial state of the army as regards this disease, and the circumstances of rainfall, temperature, etc., were unfavourable to its spread. It must not however be concluded that the decrease was entirely due to this, and in this connection the Director of Medical Services in India reports that there has been no abatement of active anti-malarial measures in any of our garrisons by means of mosquito brigades. Concurrent with these activities the administration of quinine has been developed, and all cases of malaria systematically treated, under medical officers, who keep a malarial case sheet for each man, and see that treatment is continued until he is free of infection. With this policy in force we may look forward to a considerable amelioration as regards malaria, even under adverse climatic conditions.

Omitting stations with an average strength below 500 the highest admission rates for the year were recorded in Bellary (301·7 per thousand), Mhow (251·0), Muttra (210·8), Peshawar (206·1) and Jubbulpore (185·8).

* Standard Table of the Sanitary Commissioner's Annual Report.

Classes in Malaria Instruction were held as usual at Amritsar, which were attended by several officers of the Royal Army Medical Corps. It has since been arranged that 16 Military Medical Officers and 16 subordinates will be trained annually.

The following remarks regarding enteric and paratyphoid fevers, and pyrexia of uncertain origin are taken from the General Report on the health of the British troops in India during 1911, issued by the Director, Medical Services in India.

Enteric fever.

7. The number of cases of this disease is the lowest on record. Throughout the whole of India only 170 cases are returned with 22 deaths; this is an admission rate of 2·3 per 1,000 of strength and a death rate of but 0·30. The case mortality is 12·9 per cent. The distribution by branches of the service shows that 14 cases occurred in the Cavalry with one death, 51 in the Artillery and Ammunition Columns with six deaths, 102 cases in the Infantry with fifteen deaths, and 3 cases among Staff and Departments with no death. Among individual units, the incidence has been fairly evenly distributed. One hundred and three units out of one hundred and eighty-two show no cases at all. The majority of units affected have not had more than one to three cases each. The 2nd Norfolk Regiment shows the highest number of admissions, having returned 11 cases with one death, the 2nd Royal Fusiliers and 3rd King's Royal Rifle Corps each had 6 cases with one death, the 7th Dragoon Guards had 6 cases but no death, the 2nd North Staffords 5 cases with two deaths, the 1st Durham Light Infantry 5 cases with no deaths, the 2nd Shropshires 4 cases with two deaths, the 2nd Worcestershire, the 2nd Royal Highlanders, the 2nd Welsh Fusiliers and 1st Lancashire Fusiliers had four cases with one death each. As in last year, the outstanding features in respect of this disease have been the absence of any epidemic outbreak and the occurrence of more or less isolated cases scattered over a large number of units and places. There has been, too, a remarkable freedom from attack among nursing orderlies and others engaged in attendance upon the sick. There has been no evidence to show that milk, water or articles of food have been the cause of the disease among troops. Of the 170 cases of enteric fever which occurred, 106 were among inoculated men and 64 among the non-inoculated, but as the inoculated population amounts to 85 per cent of the whole, the number of the inoculated exposed to infection is more than five times greater than the number of non-inoculated men. Other considerations connected with this question of inoculation against enteric fever will be discussed in a subsequent section of this Report.

An analysis of the years of service in India, presented by these cases of enteric fever, shows that 48 had been but one year in India, 34 two years, 20 three years, 28 four years, 22 five years, 6 six years, 4 seven years, and 8 eight years. The mean of this series is 3·1 years and the mode of the curve is 2·8 years, that is to say the maximum incidence of this disease under modern conditions falls about the thirty-second month of Indian service.

Paratyphoid fever.—As in 1910, a differentiation was carefully made between the classical enteric fever and the disease known as paratyphoid fever. Antecedent to 1910 no such differentiation had been made and the returns for earlier years under the heading of enteric fever include almost certainly cases of the then unrecognised paratyphoid fever. For 1911, the returns show 104 cases of paratyphoid fever with two deaths. One of these fatal results was caused by intestinal perforation and the diagnosis was made after death, when the specific micro-organism of the "A" variety was isolated from the ulcer. From all the cases of paratyphoid fever the specific bacillus was isolated, so that no doubt exists as to the accuracy of diagnosis. Of the total cases so diagnosed, 103 yielded the bacillus paratyphosus "A" and one yielded the "B" variety.

In striking contrast to enteric fever, the paratyphoid disease presents a very low case mortality, namely 2 per cent; the disease also has shown a tendency to manifest itself in the form of explosive outbreaks. The chief of these were at Bareilly, Lucknow, Fyzabad and Jubbulpore. The investigation and detection of these series of cases were carried out on entirely modern lines and reflect great credit on the

officers concerned, namely Major Grattan, Major Faichnie, Major Walton, and Captain Safford, all of the Royal Army Medical Corps. In no series could the source of infection be traced to water, milk or any special article of food. The incriminating factor in all the cases appears to have been the initial presence of an undetected and unsuspected infected person, indicating that in this particular disease man himself is the most dangerous factor. We are still in doubt whether the more frequent source of infection is by acute carriers or by unrecognised cases. Probably, both sources are responsible and call for immediate investigation and detection whenever two or more cases of the disease occur in any unit. No less than 97 of the total of 104 cases occurred among men who had been inoculated against enteric fever. As regards years of service in India, 49 had but one year, 22 had two years, 13 had three years, 12 had four years, 4 had five years, 2 had six years and 2 had eight years. The mean of this series is 2·19 years and the mode of the curve is 1·6 years. This indicates that the maximum incidence falls upon the newer arrivals or, in other words, the curve approximates to the type associated with so-called enteric fever in the years before inoculation was introduced. This is confirmative of the view that a considerable number of the so-called enteric fever cases of former years were really instances of paratyphoid infection.

The distribution of paratyphoid fever by branches of the service shows that only 2 cases occurred in the Cavalry, 20 among the Artillery and 82 cases with two deaths among the Infantry. Only twenty-nine units were affected with this disease. Among individual units, the greatest number occurred in the 1st Royal Scots at Bareilly who had 14 cases, the 1st Royal Lancaster Regiment at Lucknow had 11 cases with one death, the 1st Highland Light Infantry at Lucknow had 10 cases, the 2nd Royal Fusiliers at Jubbulpore had 9 cases, the 4th Worcestershire Regiment at Bareilly had 8 cases, the 3rd Middlesex Regiment at Lebong had 7 cases, "U" battery of the Royal Horse Artillery and the 20th battery of the Royal Field Artillery, both at Lucknow had 6 cases each and the 2nd East Yorkshire Regiment at Fyzabad had 5 cases. If we regard the distribution of paratyphoid fever over India as a whole we find the incidence to be very uneven in the various Divisions. The following table shows this.

Divisions.	Enteric fever.		Paratyphoid A.	
	Admissions.	Deaths.	Admissions.	Deaths.
1st (Peshawar)	11	3	2	...
2nd (Rawalpindi)	15	2	...	...
3rd (Lahore)	17	3	4	...
4th (Quetta)	15	2	4	...
5th (Mhow)	17	4	14*	...
6th (Poona)	31	2	3	...
7th (Meerut)	6	1	33	1
8th (Lucknow)	16	2	44	1
9th (Secunderabad)	33	3	...	...
Burma	3	...	...	...
Delhi Coronation Durbar	3	...	...	...
Marching	3	...	...	...
Total ...	170	22	104*	2

* One of these Paratyphoid B.

Whereas the maximum incidence of enteric fever is in the 6th and 9th Divisions, that of paratyphoid fever is in the 7th and 8th Divisions. It is difficult to explain

the facts; either paratyphoid fever has not existed in all the Divisions to any great extent, or the officers in charge of laboratories in the 7th and 8th Divisions have displayed a greater zeal and initiative than others in applying modern technique by way of early blood cultures in doubtful cases to detect the disease.

This question of diagnosis is of vital importance, as accuracy in this matter is our only means of determining the exact prevalence of this disease. Our returns for the last two years show this clearly. In 1909, paratyphoid fever was regarded as an unusual occurrence, in 1910 we developed more critical methods of diagnosis of the pyrexias of uncertain origin with the result that 39 cases were recorded. In 1911, still greater care has been taken and the number of paratyphoid fever cases has risen to 104. As this policy and practice is pressed we anticipate that the detection and presence of this disease will be still more marked. The only certain means of diagnosing paratyphoid fever is the isolation of the bacillus from the blood or dejecta of the patient during life, or from the spleen or other organs after death. The disease is a septicæmia and blood cultures made during the first week of the illness give a positive result in the majority of instances. Practically, the whole of our knowledge of the epidemiological and clinical characters of this disease is due to the work of certain officers of the Royal Army Medical Corps in India, more especially to Major Harvey, Major Grattan and Captain J. L. Wood. To them we owe much information as to the serum reactions in paratyphoid fever. In India, the diagnosis of this disease by the serum reaction of the patient is particularly complicated by the fact that nearly all of them have been inoculated against enteric fever. In such cases even when the actual bacillus paratyphosus has been isolated, the agglutination titre of the serum for the bacillus typhosus rises and is often higher than for bacillus paratyphosus. Even under the most favourable circumstances the patient's serum rarely gives a positive reaction for the A. variety of the paratyphoid micro-organism in a higher dilution than 1 in 100. Not infrequently the agglutination of B. typhosus is marked, while the bacillus paratyphosus A. is not agglutinated by a 1 in 10 dilution of the serum. Further, it is not unusual to find in cases of undoubted paratyphoid fever, from which the A. variety of bacillus has been isolated, that the patient's serum agglutinates at one time only the B. typhosus and at another time only the B. paratyphosus. The earlier work of Major Harvey and Captain Wood, both of the Royal Army Medical Corps, by which they showed that the use of the absorption method gives valuable information as to the true nature of the infecting micro-organism, has been confirmed and developed. In cases of paratyphoid fever (A) in which the patient's serum agglutinated both the enteric and paratyphoid bacillus, absorption with the A. type of bacillus removes all the agglutinins present, whereas absorption with the enteric bacillus removes only the co-agglutinins for that micro-organism, leaving intact the specific agglutinins for the B. paratyphosus (A). Another curious fact is that by the absorption method it can be shown that in cases in which the patient's serum agglutinates B. typhosus but not B. paratyphosus (A) then absorption with the latter micro-organism removes all the agglutinins from the serum.

Our experiences during the past two years bring out most clearly the variable and comparatively feeble production of agglutinins in paratyphoid fever, and this seems to be particularly characteristic of infections by the A. variety of the bacillus paratyphosus. This point has been specially brought to the notice of medical officers, and it cannot be too thoroughly understood that as a means of diagnosis of paratyphoid fever, the serological observations are beset with many fallacies and sources of error. Taken alone, they cannot be relied upon as a trustworthy routine method of diagnosis.

In leaving this subject, we are impressed with the view that a very close analogy exists between paratyphoid fever and enteric fever both from the clinical and epidemiological aspects. In general terms, they differ only in the higher mortality and greater severity of enteric fever and in the character of the causal micro-organisms.

Enterica.—Under this term we combine the incidence of the two diseases, enteric fever and paratyphoid fever. For purposes of comparison it is necessary to so group them as all our records, for years previous to 1910, make no attempt to differentiate between the two. That such differentiation is necessary is obvious from the marked difference between their respective case mortality rates and the apparent absence of inhibitory effect on paratyphoid fever by anti-enteric inoculation. Taking both enteric and paratyphoid fevers together we

find that 274 cases occurred among European troops in India in 1911, with 24 deaths. This is equivalent to an admission rate of 3·8 per 1,000 and a death rate of 0·33 per 1,000 of strength. Ten years ago, the admission rate was 12·8 and the death-rate 3·32. The following table gives the corresponding facts for the last five years.

Years.	Ratio per 1,000		Case mortality per cent.
	Admissions.	Deaths.	
1907	13·4	2·77	21·1
1908	14·5	2·76	19·0
1909	8·9	1·58	17·7
1910*...	4·6	·63	13·7
1911*...	3·8	·33	8·8

* Including paratyphoid A. and B.

Another table shows the annual admission rate per 1,000 for enterica during the last five years in all stations having an average strength of over 500 during 1911. The most notable excess rates are in Barian, Dagshai, Bareilly, Lucknow, Allahabad, Nasirabad, Belgaum and Wellington. On the other hand, Peshawar, Rawal Pindi, Sialkot, Lahore, Ambala, Kasauli, Ranikhet, Mhow, Kamptee, Jhansi, Poona and Kirkee show notable lessened incidence. It is difficult to explain these variations from year to year, but it must be remembered that the units and population are continually changing. In several instances especially at Bareilly, Lucknow and Nasirabad, the rise in admission rate may be due to the detection of cases of paratyphoid fever which, under earlier methods of diagnosis, would probably have not come into this category of enterica but been returned as cases of pyrexia of uncertain origin. The rise in incidence at Barian, Dagshai, Belgaum and Wellington was due to the occurrence of small groups of enteric fever cases in units quartered there. None of them call for detailed comment.

Stations with average annual strength of over 500 during 1911.	1907.	1908.	1909.	1910.	1911.
Peshawar	7·8	31·3	11·3	7·9	3·0
Cherat	8·3	30·2	3·4	...	2·0
Nowshera	13·5	19·8	14·3	6·1	6·4
Rawalpindi	12·5	31·9	7·2	5·9	·7
Barian Camp and Khyra Gali...	9·8	14·3	6·2	4·8	8·2
Sialkot	18·5	20·9	20·7	15·1	·8
Lahore Cantonment and Fort	19·0	11·8	25·9	9·7	4·5
Multan	15·0	30·8	20·3	2·3	4·4
Jullundur	16·2	17·9	22·5	1·6	...
Ferozepore	12·4	9·8	1·0	1·0	1·0
Ambala	7·2	8·3	3·1	5·3	...
Kasauli	26·5	8·5	...	9·3	1·9
Dagshai	1·3	2·8	2·9	1·5	9·9
Meerut	9·8	27·4	26·0	2·3	1·8
Bareilly	11·4	3·5	15·1	...	16·8
Ranikhet and Chaubuttia	23·2	14·0	9·6	6·0	·5
Chakrata	10·6	4·3	3·6	1·5	1·6
Agra and Fatehgarh	26·7	9·8	5·5	2·4	...
Lucknow	12·2	14·3	23·2	4·2	15·4
Cawnpore	11·2	25·4	...	...	...
Fort William	3·7	5·1	5·8	1·5	·8

Stations with average annual strength of over 500 during 1911.	1907.	1908.	1909.	1910.	1911.
Dinapore	11·6	8·0	20·4	5·1	5·4
Lebong	...	...	1·5	...	1·6
Allahabad	5·1	7·4	7·3	...	4·2
Fyzabad	7·9	19·2	13·7	14·2	11·6
Quetta	17·6	17·9	4·8	2·2	3·5
Karachi	·8	6·0	3·6	3·9	4·4
Hyderabad	2·0	...	...	...	1·8
Mhow and Indore	22·0	4·1	2·8	6·9	2·7
Kamptee	21·5	11·1	19·5	14·4	3·4
Nasirabad	5·1	5·0	7·2	1·1	6·0
Jhansi	51·1	26·5	7·5	13·1	3·2
Jubbulpore	21·5	34·6	11·9	6·6	4·8
Poona	12·1	9·8	12·4	8·4	3·0
Kirkee	9·1	10·1	26·0	12·0	5·4
Bombay	·9	1·7	·9	2·8	3·9
Ahmednagar	26·4	17·4	9·3	1·7	2·9
Belgaum	15·2	14·6	12·5	8·0	14·0
Secunderabad	20·6	25·9	6·7	3·4	4·5
Bangalore	28·2	19·0	10·9	6·0	4·9
Madras	7·2	11·7	...	1·5	3·0
Wellington	5·9	2·9	5·6	1·9	4·8
Rangoon	...	1·6	1·5	·8	·9

Anti-enteric Inoculation.—Steady progress has been made with this procedure. Of the European troops serving in India 85 per cent have been inoculated. By arms of the service 88 per cent of the Cavalry, 78 per cent of the Artillery, 88 per cent of the Infantry, 43 per cent of the Engineers and 27 per cent of the Staff and Departments are inoculated. The following table shows the results of the returns regarding inoculation made on the last day of the year:—

Branch of Service.	Number of inoculated men who have not had enteric fever.	Number of inoculated men who have had enteric fever.	Number of not-inoculated men who have not had enteric fever.	Number of not-inoculated men who have had enteric fever.
Cavalry	4,478	153	767	72
Royal Horse Artillery	1,397	47	357	43
Royal Field „	5,993	100	1,272	194
Royal Garrison „	2,958	38	660	114
Ammunition Columns	658	20	116	35
Infantry	43,820	606	4,375	512
Attached Troops	390	7	65	10
Royal Engineers	38	1	73	5
Staff and Departments	903	15	792	89
Total ...	60,635	987	8,477	1,075

Of the 170 cases of enteric fever which occurred in 1911 we find that 106 were inoculated and 64 were non-inoculated men. Eleven deaths occurred among the inoculated and eleven among those not-inoculated. The ratio per 1,000 of strength of admissions for enteric fever among the inoculated was 1·7, and the corresponding ratio of deaths was 0·17. Among the not-inoculated the admission rate was 5·9 per 1,000 and the death rate 1·15. As regards case mortality, the percentage figures are 10·37 for the inoculated and 17·18 for the not-inoculated. The disparity between the two groups is very marked. The co-efficient of correlation in this series between inoculation and freedom from attack by enteric fever is 0·3212± ·0068, and that between inoculation and recovery after attack is 0·7524± 0·0667.

The influence of inoculation against paratyphoid infection appears to be negative. Of the 104 cases of paratyphoid fever, no less than 97 were inoculated men with 2 deaths, while the other 7 cases were not-inoculated men. The admission rate per 1,000 among the inoculated is 1·57, and 0·73 among the non-inoculated. The co-efficient of correlation between inoculation and freedom from attack by paratyphoid fever is 0·1994± ·0073.

If we take the two diseases, enteric fever and paratyphoid fever together we find that the admission rate among the inoculated is 2·75 per 1,000, while among the not-inoculated it is 10·88. The corresponding death rates per 1,000 are 0·17 and 1·15; further, the co-efficient of correlation between inoculation and freedom from attack is ·2527 ±·0071, while the co-efficient between inoculation and recovery after attack is ·6579± ·0684. The above figures indicate that against true enteric fever the value of inoculation is most marked and the case in favour of the procedure is much strengthened by our experiences during 1911. The disturbing factor is the prevalence of paratyphoid fever, against which disease, anti-enteric inoculation appears to have little influence. This view was hinted at in last year's report and emphasizes the plea for a polyvalent or rather a bi-valent emulsion with which inoculation could be carried out against both diseases. The re-inoculation of men after a lapse of thirty months since their primary inoculation is being steadily pressed and meets with an encouraging support from all ranks.

The enteric fever depôts at Naini Tal and Wellington have done excellent work during the year. Their activities have been extended in that we now send to these depôts not only convalescents after enteric and paratyphoid fever, but convalescents from such types of pyrexia of uncertain origin, which although not diagnosed as either disease yet present presumptive evidence that they might have been one or the other. This policy has borne fruit in that, at Naini Tal, out of 138 cases of this kind sent there, five were found to be excreting the paratyphoid A. bacillus in their fæces. Captain J. L. Wood, who is in charge of this depôt, reports that in his opinion, the majority of these cases of pyrexia of uncertain origin were really paratyphoid fever (A) and that an appreciable number of the so-called enteric fever cases were not that disease but rather paratyphoid. If this be so, and we have reason to accept that officer's views, then the number of enteric fever cases during the year has been overstated and the number of paratyphoid fever cases understated. This brings us again to the opinion that, not until the necessity for early blood culture, say 2nd to 5th day, is fully recognised by medical officers, will there be any hope of reducing the chaos which surrounds the pyrexias of short duration in India, and of arriving at the true facts concerning the precise prevalence of enteric and paratyphoid infections.

Out of the 95 cases of enteric fever sent to Naini Tal, not a single carrier was discovered, while among 85 paratyphoid cases twelve carriers were detected. Only one of these could be classed as a "chronic carrier" that is continuing to excrete the infective bacillus for more than six months. Details regarding the carrier cases are given in the following Table. The treatment of carriers by means of an autogenous bacillary emulsion, which last year promised good results, has been definitely found to be inoperative both at Naini Tal and Wellington. The general health at both depôts has been good and no case of primary enteric or paratyphoid infection has occurred in them, a fact which speaks well for the technical discipline and conservancy arrangements in both establishments.

Depôt.	Number and Initial.	Corps.	Place and date of attack.	Period under observation.	Type of carrier.	How disposed of.
Wellington ...	3718 W. ...	2nd Norfolk Regiment.	Belgaum—7th May 1911.	17th August 1911 to 31st December 1911.	Enteric fæcal.	Still under observation.
" ...	9126 T. ...	2nd Cameron Highlanders.	Bangalore—15th May 1911.	5th September 1911 to 31st December 1911.	Ditto.	Ditto.
Naini Tal ...	7913 C. ...	2nd East Yorks Regiment.	Fyzabad—21st April 1911.	16th June 1911 to 31st December 1911.	Paratyphoid fæcal.	Still under observation.
" ...	9989 E. ...	2nd Liverpool Regiment.	Lahore—23rd October 1911.	30th December 1911 to 31st December 1911.	Ditto.	Ditto.
" ...	55444 D. ...	20th Battery, Royal Field Artillery.	Lucknow—26th April 1911.	9th June 1911 to 10th November 1911.	Ditto.	Returned to duty.
" ...	9369 Mck.	1st Royal Scots	Bareilly—10th February 1911.	22nd March 1911 to 4th July 1911.	Paratyphoid fæcal.	Returned to duty.
" ...	37741 J. ...	"U" Battery, Royal Horse Artillery	Lucknow—30th March 1911.	10th April 1911 to 8th November 1911.	Ditto.	Ditto.
" ...	40042 S. ...	79th Battery, Royal Field Artillery.	Dinapore—28th April 1911.	11th July 1911 to 13th October 1911.	Ditto.	Ditto.
" ...	52147 S. ...	"U" Battery, Royal Horse Artillery.	Lucknow—6th March 1911.	10th April 1911 to 13th September 1911.	Ditto.	Ditto.
" ...	11482 J. ...	4th Worcester Regiment.	Bareilly—21st February 1911.	23rd May 1911 to 13th December 1911.	Paratyphoid urinary.	Ditto.
" ...	7979 A. ...	2nd Royal Berkshire Regiment.	Chakrata—31st March 1911.	7th August 1911 to 31st December 1911.	Paratyphoid fæcal.	Still under observation.
" ...	333 Mck. ...	1st Seaforth Highlanders.	Bareilly—20th February 1911.	6th April 1911 to 18th December 1911.	Ditto.	Returned to duty.
" ...	11743 McL.	1st Highland Light Infantry.	Lucknow—16th July 1911.	1st September 1911 to 31st December 1911.	Ditto.	Still under observation.
" ...	52197 C. ...	"U" Battery, Royal Horse Artillery.	Lucknow—13th March 1911.	10th April 1911 to 13th September 1911.	Ditto.	Returned to duty.

At Wellington, of the three chronic carriers mentioned in last year's Report, one was cured and two were invalided to England. Out of 67 convalescents sent to this Depôt, two carriers have been detected during the year. From both the Naini Tal and Wellington depôts, interesting details as to serological reactions of patients, and other technical work have been received. They do not lend themselves for inclusion in this report, but indicate that the work carried on in the laboratories of the depôts is both modern and progressive. The scheme for extending the advantages of these depôts to officers and women has advanced some stages but is still uncompleted owing to financial stress. We are, however, pressing the matter.

Pyrexia of uncertain origin.

8. This group is associated intimately with the enteric, paratyphoid and malaria cases. Increased care has been taken to secure accuracy of diagnosis, but the difficulties are many. The difficulties associated with this group have to some extent been considered under the head of paratyphoid fever. The standard of work, in this sense is steadily improving in all the British Military hospitals. It is satisfactory to record that the number of cases shown under this head has fallen; the actual figures are

1,914 in 1911 as against 2,733 in 1910. We have still much to learn regarding some of the ill-defined pyrexias, but as more use is made of laboratory methods in diagnosis, the greater will be the accuracy of our returns.

The following table shows the essential facts under this heading and that of Malaria for the last three years:—

Divisions.	ADMISSION PER 1,000 OF STRENGTH.					
	PYREXIA OF UNCERTAIN ORIGIN.			MALARIA.		
	1909.	1910.	1911.	1909.	1910.	1911.
1st (Peshawar) Division	140·3	29·6	54·0	376·2	421·8	196·0
2nd (Rawalpindi) Division	27·0	40·8	14·2	184·9	128·4	86·7
3rd (Lahore) Division	73·8	54·6	39·6	256·0	156·1	94·8
4th (Quetta) Division	15·9	7·4	10·3	135·9	130·4	129·2
5th (Mhow) Division	14·5	7·3	5·2	312·3	206·8	168·5
6th (Poona) Division	32·4	42·5	20·2	153·2	102·3	95·5
7th (Meerut) Division	62·2	28·0	9·6	339·5	191·5	75·2
8th (Lucknow) Division	118·7	53·7	56·3	113·9	64·6	48·0
9th (Secunderabad) Division	20·2	21·8	13·4	34·6	32·0	48·0
Burma Division	144·2	82·6	90·2	151·7	53·9	41·8
Aden Brigade	136·6	88·5	35·7	419·6	74·1	34·7

Sandfly fever.

9. The endemic three-day non-fatal fever now correctly named pappataci fever was given a separate heading for the first time in the statistics for 1910. The heading was used by the medical officers of European troops in only 18 stations in 1911, the total number of cases recorded being 1,393 as compared with 512 in 1910. Of these ninety-one per cent were reported from the Northern Army, and only 9 per cent from the Southern Army. As regards this disease the D. M. S. writes: "This increase must be read in connection with the reductions under pyrexia of uncertain origin and malaria. The facts are another example of increased accuracy in diagnosis. This fever in certain garrisons, such as Nowshera, Attock, Multan, Hyderabad in Sind and Kamptee has been the cause of some degree of ineffectiveness among troops. The prophylaxis is associated intimately with that of malaria, and until all troops make a systematic use of netting during the night there is bound to be a considerable amount of temporary sickness from sandfly fever."

Plague and some other diseases.

10. Among European troops in India there were 9 cases of plague with 6 deaths during 1911 as compared with 2 cases and 1 death in 1910. Measles caused 25 admissions to hospital and erysipelas 24, none of the cases being fatal. Only 3 admissions were recorded as due to beri-beri, one each at Dum Dum, Karachi and Malapuram. Rheumatic fever was responsible for 310 admissions to hospital and seven soldiers were invalided for this disease.

Tubercle of the lungs.

11. The steady decline in the admissions and deaths from tubercle of the lungs which had been continuous since 1903 was interrupted in 1910 by an increase from 81 to 106 in the admissions, from 9 to 17 in the deaths and from 66 to 71 in the invaliding. A considerable decrease again occurred in 1911, admissions, deaths and invaliding falling to 68, 5 and 55 respectively. There were 40 cases in the Northern Army and 28 in the Southern. The largest number of cases in any station was 6 in Kasauli, 5 each in Quetta and Ambala, and 4 in Agra.

Pneumonia.

12. The admission and death rates from pneumonia rose slightly in 1911 and were 2·1 and ·26 per thousand respectively as compared with 2·0 and ·25 in 1910 and 2·9 and ·31 in 1909, the total numbers of admissions and deaths in each year being 153 and 19 in 1911, 144 and 18 in 1910 and 209 and 22 in 1909. The disease was considerably more prevalent in the Northern than in the Southern Army and comparing its relative incidence with that in 1910 it was less prevalent in six of the geographical groups and more so in six. Excluding stations where the average strength was below 200 Multan (admission rate 10·0 per thousand), Cawnpore (7·5), Nowshera (6·4), Rurki (5·9), and Delhi (5·8) were the stations with the highest admission rates during 1911.

Respiratory diseases.

13. There was a decrease in the admission rate on account of respiratory diseases (among which pneumonia is not now included) from 13·0 in 1910 to 12·2 and the number of deaths fell from 12 to 8. The diseases were most frequent in the Indus Valley and North-West Rajputana. Of the deaths two were due to broncho pneumonia and one each to asthma, bronchitis, congestion of lung, pulmonary apoplexy, pleurisy and empyema.

Dysentery and diarrhœa.

14. The admission and death rates from dysentery were 7·7 and ·26 per thousand in 1911 against 7·7 and ·23 in 1910, a slight increase in the death rate. The death rate was slightly higher in the Southern Army. The disease was most prevalent among troops in the 6th (Poona), Burma and 8th (Lucknow) Divisions and among geographical groups the highest admission rates were recorded in groups XI and IV. For the European army as a whole the months of greatest prevalence were August, September and July and those of least prevalence January, March and February. There were in all 560 cases of dysentery with 19 deaths.

There were 788 cases of diarrhœa with one death in 1911 against 807 non-fatal cases in 1910. The admission rate was highest amongst troops in the Bengal and Orissa geographical group and omitting stations below 1,000 of strength the incidence was highest at Sialkot, Peshawar and Mhow.

Hepatic abscess and Alcoholism.

15. Next to enteric fever, hepatic abscess is the most frequent cause of death among European troops, but the admissions and deaths on account of it have decreased greatly during recent years. In 1911 it caused 71 admissions to hospital and 33 deaths as compared with 75 admissions and 35 deaths in 1910 and 100 admissions and 34 deaths in 1909. The admission rate was higher and death rate lower in the Northern than in the Southern Army and the largest numbers of cases in stations were eleven in Lucknow, six in Ambala and five in Jubbulpore. The decrease in the number of cases of liver abscess is coincident with an equally steady fall in the number of admissions to hospital for alcoholism. From the figures in the margin it will be seen that in 1911 there were only 32 admissions to hospital for this cause. Carrying the comparison to earlier years than 1906 it may be noted that in 1905 there were 197 admissions and that the annual mean number of admissions for the years 1900 to 1904 was 231.

	Total admissions.	
	Abscess of liver.	Alcoholism.
1906	183	170
1907	165	94
1908	115	71
1909	100	65
1910	75	37
1911	71	32

16. The remarkable reduction of venereal diseases among European troops in India is an example of the results of earnest co-operative effort not only between combatant and medical officers, chaplains, the authorities of the Royal Army Temperance Association and other civilian officials, but between all these and the men themselves. In 1911 the admission rate for all diseases under this heading was only 53·1 per thousand as compared with 58·9 in 1910 and 67·8 in the previous year. Only two deaths were recorded and only 14 men had to be invalided as compared with 25 in 1910 and 34 in 1909. The admission rate among troops of the Northern Army was 47·3 per thousand and among troops of the Southern Army 61·9, the difference in these two rates being considerably less than usual. As regards Divisions, the admission rate was, as usual, highest among troops in the Burma Division. Among the stations of the Northern Army the highest admission rates were recorded in Naini Tal, Attock and Benares and among those of the Southern Army at Purandhar, Poonamallee and Meiktila.

Venereal diseases.

17. The total number of deaths recorded as a result of heat stroke during 1911 was twenty-four as compared with seven in 1910, fifteen in 1909 and thirty-seven in 1908. Excluding troops marching 16 stations returned deaths from this cause. One station returned three deaths, five stations 2 each and ten stations 1 each.

Heat Stroke.

18. The mean annual number of suicides reported in the decade, 1901 to 1910 was 19 and in 1911 the number was 22 of which 12 were by gunshot, 4 by cut-throat, 3 by poison, 2 by drowning and one by hanging.

Suicide.

19. From the European army of India 515 men were invalided in 1911 (7 per thousand of strength) as compared with 563 (8 per thousand) in the previous year. In the Northern Army the rate was 7·74 per thousand and in the Southern Army it was 6·96 per thousand. The principal diseases for which invaliding was necessary have already been mentioned in the first paragraph of this section. Of the total number of men invalided 86 per cent were under 30 years of age and 75 per cent had been less than five years in India.

Invaliding.

20. The average strength of commissioned officers with European troops in India during 1911 was 2345 and among them there were 1365 admissions to hospital, 37 were invalided, and 19 died during the year. The admission and death rates were higher than in 1910, but the invaliding and constantly sick rates fell from 18·61 and 21·6 to 15·78 and 20·6 respectively.

Officers.

Malaria was the disease which caused most admissions to hospital but the admission rate was much lower than among the men. There were in all 15 admissions from enteric fever with one death, the admission rate (6·4 per thousand) being the lowest on record, but nearly twice as high as among the men. The 15 cases were spread over eleven stations. There were three cases of small-pox and one fatal case of cholera. No case of plague occurred. There were only 2 admissions on account of venereal disease (Syphilis one, Gonorrhœa one) both in the Southern Army; the case of Gonorrhœa was invalided.

Debility, malaria, and abscess of liver were the chief causes of invaliding.

21. The average strength of the women during 1911 was 4,248, an increase of 111 on that of the previous year. The statistics of health were very favourable, the rates of admission to hospital and of death being 495·8 and 7·30 per thousand, respectively, as compared with 504·7 and 6·28 in 1910. The constantly sick rate was 20·4 as compared with 21·6. From all causes 51 women were invalided during the year, 13 of them on account of debility and 6 on account of tubercle of lung.

Women.

The chief causes of admission to hospital were, as usual, anæmia and debility, diseases peculiar to women, and malaria, which together accounted for 56 per cent of the total number of admissions from all causes.

Relative incidence of enteric fever among men and women of the European Army in India. Admission and death rates per 1,000 of strength.

Years.	Admission rates.		Death rates.	
	Men.	Women.	Men.	Women.
1905 ...	16·1	8·6	3·00	1·48
1906 ...	15·6	7·3	3·19	1·46
1907 ...	13·1	8·9	2·77	1·72
1908 ...	14·5	13·3	2·76	1·89
1909 ...	8·9	10·2	1·58	1·53
1910 ...	4·6	6·5	·63	1·45
1911 ...	3·8	6·4	·33	·71

On page 27 of the 1909 report the fact was noted that for the first time in the history of enteric fever in the European army of India the admission rate for this disease was higher among the women than among the men and the death rate was very nearly as high. The statistics of 1910 and 1911 afford further evidence of this noteworthy change of relative incidence, for although both the admission and the death rate among the women were lower than in 1910 they were considerably higher than among the men. Of the total number of deaths from all causes (31) among the women 3 were due to enteric fever, the case mortality being higher than among the men. No other disease caused more than 2 deaths. Only 1 woman suffered from small-pox during 1911.

Children.

22. The admission and death rates among the children were higher than in 1910. The strength was 7,056, the admission rate 370·6, the constantly sick rate 13·2 and the death rate 30·33. The chief causes of sickness were measles, diarrhœa, respiratory diseases, debility and malaria which together accounted for about 49 per cent of the total admissions. Of the 214 deaths 32 were attributed to enteritis, 26 to respiratory disease, 24 to diarrhœa, 24 to debility and immaturity at birth and 22 to convulsions. There were 30 admissions to hospital with 1 death from enteric fever and 139 admissions with 2 deaths from malaria. Among the exanthemata to which children are liable there came under treatment during the year 470 cases of measles, 99 of chicken-pox, 46 of German measles and 2 of scarlet fever. There was 1 fatal case of small-pox. Whooping cough caused 29 admissions to hospital, diphtheria 11 and mumps 11.

The strength at different age-periods, the death rates per mille and the relative liability to death at each of these periods, are shown in Table XII.* Immaturity at birth was the cause of 7·5 per cent of the total number of deaths among children under 6 months of age.

*Standard Table of the Sanitary Commissioner's Annual Report.

SECTION II.

INDIAN ARMY.

23. The health of the Indian troops throughout the year has been very good.

India.

Including those on duty in China and in other stations outside India, the average strength was 131,213 as compared with 131,274 in the previous year. The accompanying table shows concisely the sick rates for the year. It is satisfactory to note that each rate was lower than the corresponding rate in 1910. The death rates as shown in the table are however misleading as they do not include the deaths of men while on sick leave or furlough at their homes. If these be included the rate for 1911, is 6·78, and for 1910, 7·12.

Indian troops.	All causes. Ratios per mille.		
	1905-09.	1910.	1911.
Admissions	635·5	572·8	515·8
Constantly sick.	22·3	21·1	19·8
Deaths ...	6·78	4·89	4·48
Invalids...	6·82	5·21	4·43

The following table shows the death rates per 1,000 among Indian and British Troops since 1880.

Indian Troops.			British Troops.	Indian Troops.			British Troops.	Indian Troops.			British Troops.
Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.	Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.	Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.
1880 ...	39·22	41·12	24·85	1890 ...	15·91	18·64	13·84	1900 ...	14·04	18·57	14·62
1881 ...	19·24	22·62	16·86	1891 ...	15·44	19·34	15·89	1901 ...	10·68	13·89	12·38
1882 ...	12·24	14·76	12·07	1892 ...	14·97	18·67	17·07	1902 ...	11·16	15·01	14·68
1883 ...	11·76	14·31	10·88	1893 ...	10·29	12·81	12·61	1903 ...	10·04	16·62	13·05
1884 ...	10·50	12·22	12·56	1894 ...	10·76	13·59	16·07	1904 ...	8·46	12·08	10·83
1885 ...	13·67	16·09	14·55	1895 ...	11·60	15·71	15·26	1905 ...	8·09	9·50	10·05
1886 ...	13·27	19·46	15·18	1896 ...	10·20	12·57	14·84	1906 ...	6·57	8·58	10·43
1887 ...	11·68	18·17	14·20	1897 ...	13·12	14·90	22·93	1907 ...	6·27	8·51	8·18
1888 ...	12·84	16·14	14·84	1898 ...	11·07	13·33	20·05	1908 ...	7·41	8·49	9·78
1889 ...	12·94	16·19	16·60	1899 ...	10·70	14·50	12·75	1909 ...	5·62	6·42	6·25
								1910 ...	4·89	7·12	4·66
								1911 ...	4·48	6·78	4·89

The Indian army has shared with other communities in the decrease of malaria, and it is to this that the reduced admission rate is chiefly due. Decreased admission rates are also shown from dysentery, sandfly fever, venereal diseases, and pneumonia, whilst respiratory diseases, pyrexia of uncertain origin and influenza were rather more prevalent. The diminished death rate was chiefly due to there being fewer deaths from pneumonia, pyrexia of uncertain origin and circulatory diseases.

In order of frequency the chief causes of sickness were malaria, pyrexia of uncertain origin, respiratory diseases and dysentery: the chief causes of death were pneumonia, enteric fever, malaria and respiratory diseases.

The number of invalidings was 581, as compared with 684 in 1910, the chief causes of this source of loss being tubercle of the lungs, injuries, anæmia and

debility and venereal diseases. A comparison of Tables VII and II shows that the Indian troops suffered less than the European troops from venereal diseases, sandfly fever, hepatic diseases, diarrhœa, enteric fever, and influenza, but more from respiratory diseases, dysentery and malaria.

Northern and Southern Armies Divisions.

24. As in former years sickness and mortality were more prevalent in the Northern Army than in the Southern. The statistics of the former show an excess in admission rate of 61·1 per thousand and in death rate of 1·09 per thousand. The excess in admission rate was chiefly due to respiratory diseases and dysentery, and in the death rate the chief factors were pneumonia and malaria. The relative incidence of the different diseases amongst European and Indian troops are in the main in correspondence.

As regards Divisions the least favourable statistics were returned by the Burma, Peshawar and Meerut Divisions.

Stations outside of India.

The accompanying Table complements the information given in Table XV.*

	Average strength.	Admission rate.	Death rate.
Aden Brigade	876	777	4·57
Persian Gulf...	529	607	9·45
Colombo and Singapore	1,661	716	6·62
Tien-tsin, Hong Kong and Kowloon...	2,518	481	3·97

In the Aden Brigade the chief causes of sickness were †malaria, pyrexia of uncertain origin, dysentery and diarrhœa.

†Aden proper, had an admission rate of 337·7 per thousand.

As regards stations in the Persian Gulf the statistics are incomplete, but the following facts are worthy of note. The small garrison of 26 men at Muscat had an admission rate of 461·5 per thousand from malaria, at Shiraz the death rate from all causes was 25·97.

At Jask, with an average strength of 186, the admission rate from all causes was 1,053·8, the chief factors being pyrexia of uncertain origin and malaria. The chief cause of sickness in Singapore was malaria, the admission rate being 562·9 per thousand and the death rate 4·75.

The troops in China were very healthy, practically the only cause of sickness being respiratory diseases which in Tien-tsin caused an admission rate of 147·8 and in Hong Kong of 173·0. The death rate in Tien-tsin was 1·16 per thousand, entirely due to respiratory diseases, a very remarkable figure.

Geographical Groups.

25. Troops located in the Western Coast stations suffered, as in former years, the most heavily, the chief cause of sickness being malaria, which was much more prevalent than in 1910. The Burma groups also suffered heavily, admission rates rising on the coast area from 634·0 per thousand to 741·9, and in the Inland group from 443·6 to 742·6. These increases were also due to malaria.

Stations.

26. In 1911, 39 stations had an average strength (of Indian troops) of over one thousand. The rates of admission were very high in Dera Ismail Khan, Fort Dufferin, Rangoon and Peshawar, and the death rates were high in Dehra Dun, Edwardesabad, Dera Ismail Khan and Bakloh. In Dera Ismail Khan the admission rate was 1,275 per thousand, in Fort Dufferin it was 833, in Rangoon 813, and in Peshawar 801. Malaria was the chief cause of the high rate in all except in Rangoon where pyrexia of uncertain origin was most prevalent. The highest death rate in any of the larger stations was 14·18 per thousand in Dehra Dun, the chief cause of the mortality being enteric fever. Abstracts of the cantonment sanitary reports upon 10 of the most unhealthy stations will be found at Table XVI.*

* Standard Tables of the Sanitary Commissioner's Annual Report.

The regiments which suffered most severely from sickness during the current year were the 1-2nd and 2-2nd Gurkha Rifles at Dehra Dun, the 23rd Cavalry at Quetta, and the 96th Berar Infantry at Bombay. The admission rates of these regiments were as follows:—

	Admission rate.	Death rate.
1-2nd Gurkhas, Dehra Dun	281·0	18·73
2-2nd „ „	287·9	16·85
23rd Cavalry, Quetta	383·9	15·75
96th Berar Infantry, Bombay	1,612·9	14·39

These will be referred to in the paragraphs relating to the different diseases.

Cholera.

27. The number of cases of cholera in the Indian army was 16, and the number of deaths 14 as compared with 21 and 12 in 1910. No individual regiment had more than 2 cases.

Small-pox.

28. The total number of admissions for small-pox was 36 with no death as compared with 22 with 1 death in the previous year. Four cases occurred in the 83rd Wallajahbad Light Infantry at St. Thomas' Mount. These were contracted in the bazaar or in the city where small-pox was prevalent. All had been previously vaccinated, and none of the patients died. In no other regiment did more than 2 cases occur.

Malaria.

29. It is well nigh impossible in the Indian army to gauge at all accurately the condition of a regiment as regards this disease. Every precaution may be taken to improve matters in the station in which the regiment is located, but malaria may still occupy a prominent position in the statistics of the regiment. In all cases it is necessary to take into account the effect of the leave and furlough system which prevails. In many regimental reports appears the statement of the medical officer, that although malaria was present to a considerable extent in the regiment the disease was contracted not in the station, in which the regiment was located, but in some other part of India from which its recruits are drawn, and to which its men return on leave. It is therefore necessary in this report to confine one's remarks to the general prevalence of the disease, and to those stations or regiments in which malaria was a prominent feature. The Indian army shared with the population of India as a whole in suffering less from malaria than in 1910. The rate of admission fell from 160 per thousand to 105, but the death rate rose from ·25 per thousand to ·42. The admission rate represents 13,778 admissions, and the death rate 55 deaths, as compared with 20,960, and 33 respectively in the previous year.

The heaviest admission rates (in stations whose average strength was above 150), occurred in Bombay (646 per thousand), Singapore (563), Hyderabad (411), Dera Ismail Khan (411), Hangu (390), Bellary (347) and Aden (338).

It would appear from the above that Bombay suffered severely from malaria, and the figure is worthy of investigation from the point of view of the warning given at the commencement of this paragraph. In Table XVIII* it will be seen that this epidemic occurred in the months of October, November and December. The admissions rose suddenly from 22 in September to 140 in October. The medical officer of the 96th Berar Infantry which formed the Indian Garrison of Bombay reports that the regiment went into camp during October, the 2nd-half battalion for the first fortnight, and the 1st-half battalion for the 2nd fortnight. The camp was situated at Ghat Kopar in the jungle at the foot of the Western Ghauts. Admissions for malaria began to rise in the half battalions for the most part after their return to Bombay. Taking into account the period of incubation of the disease, it is reasonable to conclude, that it was contracted in camp.

* Standard Table of the Sanitary Commissioner's Annual Report.

The high figure for Hyderabad Sind, is due to an epidemic amongst the 10th Jats, which remained over as a legacy from the previous autumn, and was practically confined to the first 3 months of the year. The cause of the epidemic was the swamping of the low-lying ground in the cantonments and in the city itself. Overcrowding in the hospital rendered segregation impossible—and it was not until January, when the regiment went into camp, that headway was made against the epidemic. The medical officer also emphasizes, as an indirect cause of amelioration, the removal to their homes of 30 patients infected with the Malignant Tertian Parasite. The lesson to be drawn from this epidemic is the importance of segregation, and the necessity at times of treating epidemic malaria as seriously and as rigorously as one would treat epidemic cholera. Immediate anti-mosquito measures may be impossible and the distribution of quinine as a prophylactic measure, with many sources of infection present, likely to be of little avail. In such cases it should not be forgotten that adoption of such measures as evacuation and removal of the regiment to a healthy camp, in which segregation and quinine treatment of cases can be surely and simply carried out may be followed by most excellent results.

In Bangalore amongst the 101st Grenadiers, the high incidence of malaria is ascribed to the presence of marshy ground within the lines, the improvement of which is under consideration. An exceedingly interesting report regarding the 91st Punjabis stationed in Mandalay is furnished by Captain H. Stott. The regiment suffered heavily, 270 cases occurring from July to December. He points out that in Mandalay cases falling under the heading pyrexia of uncertain origin are for the most part malarious. The parasite rate in August 1911, was 11·11 amongst the children of the sepoys. The effects of quinine prophylaxis were disappointing. From October to December the regiment was divided into 2 classes, each under the same conditions. The reduction in case incidence in the 2 classes, one receiving 15 grains of quinine thrice weekly, and the other remaining untreated were the same—21·5 per cent. The investigation of this point is being continued. Captain Stott furnishes with his report a map of the fort, in which anopheline breeding places are entered. These are found in channels which empty into the moat. The civil population, living outside of the fort, had not suffered to any great extent, as there are no breeding places there. The jail population has not suffered, there being no anopheline breeding places within its walls. The admission rate amongst the 92nd Punjabis, living in the fort and under the same conditions, is only one-third that of the 91st Punjabis, owing to the former regiment having been provided with mosquito curtains. Captain Stott reports that the work of dealing with anopheline breeding places is being proceeded with.

Pyrexia of uncertain origin.

30. This heading as in former years includes many types of disease. In the 1/9th Gurkhas stationed in Drosh and Chitral, 194 cases probably of sandfly fever are included, and it is to be remembered that the 1/3rd Gurkhas reported a similar undiagnosed type of fever from Chitral in 1910. The medical officer of the 74th Punjabis (Lucknow) reports an outbreak of pyrexia during the latter months of the year, which he classifies as follows :—

	7 day fever.	3 day fever.	Others.
September	5	5	3
October...	42	37	3
November	34	35	2
Total ...	81	77	8

The epidemic was general throughout the regiment, irrespective of caste or barracks. Sandflies were not found, nor did the sepoys complain of their presence. No microscopical changes were noted in the blood, nor was a rash observed. All cases recovered and there were no after effects. From the figures given overleaf it would not appear that the 2 fevers were of different origin. The question of their classification must remain indeterminate.

31. The nature of this disease was fully discussed in the report of 1910. Among Indian troops 114 cases, with no death were recorded during the year, nearly all of them from Nowshera, Peshawar, Mardan, Dargai and Kohat, which are situated close together on the North-West Frontier. As Kila Drosh and Chitral were reported as suffering in 1910, the 194 cases in the 1/9th Gurkhas may probably also be included under this head. From the 82nd Punjabis at Nowshera, 30 cases are reported; from the 25th Cavalry 18 cases and from the 15th Lancers 18 cases, both at Risalpur; from the 55th Coke's Rifles at Dargai 10 cases; and from the 69th Punjabis at Peshawar 10 cases.

Sandfly fever.

32. There were 17 admissions on account of kala azar during the year as compared with 9 in 1910. Including the patients who remained under treatment from that year there were 13 deaths. The regiments in which the cases occurred were the 1/2nd, 2/2nd, 2/9th, 1/3rd, and 2/6th Gurkha Rifles, the 7th and the 11th Rajputs.

Kala Azar. Relapsing fever. Typhus fever.

Twenty-four cases of relapsing fever (with no deaths) were recorded. An outbreak of 13 cases occurred amongst the 38th Central India Horse at Goona, which was probably started by the return of a syce from leave in an endemic area.

In the 122nd Rajputana Infantry, Fort Sandeman, a similar importation is reported, which caused 5 cases.

No cases of typhus were reported during the year.

33. The prevalence of enteric fever among Indian troops was less than in 1910. Admissions numbered 302 as compared with 329 in 1910, and the number of deaths was 55 as compared with 58. The cases were distributed amongst 114 regiments in 60 different stations. Those which suffered most severely were the 1/7th, 1/3rd, 1/2nd, 1/6th Gurkha Rifles with 17, 16, 11, and 8 cases respectively, and the 30th Punjabis and 31st Lancers with 8 cases each. Anti-typhoid inoculation is being introduced in various regiments and in the above in particular and the after treatment of cases is being carefully carried out. The source of infection is, as is usual amongst Indian troops, difficult to trace.

Enteric fever.

34. The incidence of Mediterranean fever is much the same as last year, there having been 24 cases, with 3 death as compared with 23 admissions and no death in 1910. Nine of the admissions occurred at Delhi, during the Coronation Durbar, 6 at Lahore Cantonment, 3 at Kohat and 2 at Poona.

Mediterranean fever.

35. There was a marked increase in the incidence of plague. The total number of admissions during the year was 95 with 35 deaths, as compared with 31 cases and 22 deaths in 1910. Of these 59 cases with 3 deaths occurred in the 99th Infantry at Sehore, Central India. Plague was prevalent in a very severe form in the neighbourhood. The history of the outbreak in the regiment is as follows. Owing to the prevalence of plague in the bazaars inoculation of all men and followers present was carried out in March. Many were on leave, but by July the inoculation of all men and followers was completed. Among non-combatants, 2 refused inoculation; they were attacked by plague in September and both died. Dead rats were found in the lines about the end of August. The first case of plague in the lines occurred on the 5th of October and from the 12th to the 28th of that month cases were admitted daily. The last case occurred on November 5th. Nearly all the cases were modified by inoculation and consequently very mild. The only 2 uninoculated cases (a Sub-Assistant Surgeon and his wife) both died. Among the 57 inoculated cases, 1 follower died. The medical officer remarks that in all cases the diagnosis was undoubted, but that many were of so mild a type that they might have passed unnoticed. He draws attention to the high rate of recovery which prevailed, and suggests that in a civil population many modified attacks may remain unrecorded, and so detract from the statistical evidence in favour of the influence of inoculation on the recovery rate.

Plague.

Six cases of plague were recorded in the 128th Pioneers, and 5 each in the 9th Hodson's Horse and the 22nd Derajat Mountain Battery.

36. The total number of admissions on account of scurvy during 1911 was 109 or 0·8 per thousand, as compared with 100 cases in the previous year. Of these 27 cases occurred in the 96th Berar Infantry.

Scurvy.

37. It will be seen from the accompanying Table that with the exception of a slight increase in the death rate from this disease amongst Gurkhas, there has been considerable improvement. The admissions amongst Gurkhas were 56 as compared with 57 in 1910 and the deaths 11 as compared with 8.

Tubercle of the lungs.

Tubercle of the lungs. Ratio per 1,000.							
Years.	Army of India.		Gurkhas.		Excluding Gurkhas.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1901 ...	4·2	·84	13·1	3·95	3·4	·57
1902 ...	4·3	·80	15·6	4·24	3·2	·47
1903 ...	5·9	·68	28·9	2·88	3·3	·44
1904 ...	3·9	·51	10·6	2·66	3·2	·28
1905 ...	3·1	·50	6·1	1·58	2·7	·37
1906 ...	2·5	·52	5·2	2·41	2·2	·29
1907 ...	2·5	·33	4·8	1·03	2·3	·24
1908 ...	3·0	·42	5·0	1·43	2·7	·28
1909 ...	2·3	·39	4·0	1·33	2·1	·26
1910 ...	2·4	·19	3·6	·50	2·3	·15
1911 ...	2·1	·21	3·6	·70	1·9	·14

There were 8 admissions each amongst the Corps of Guides and the 13th Rajputs, and 7 each in the 2/2nd, 2/5th, 2/9th Gurkha Rifles and the 32nd Sikh Pioneers.

The medical officer of the Corps of Guides ascribes the high incidence in his regiment to the bad ventilation and overcrowding of Fort Abazai. The cases amongst the 13th Rajputs were all contracted in Hong Kong.

38. The admission rate on account of pneumonia was 7·5 per thousand and the death rate ·98 as compared with rates of 9·4 and 1·34 per thousand respectively in 1910. The disease was less prevalent than in the previous year in 9 of the 12 geographical groups and the highest admission rates for the year were recorded in the Assam group (12·4 per thousand), the North-West Frontier group (12·3) and the Western Coast group (11·6). Stations at which the disease was most prevalent were Jutogh, Edwardesabad, Mardan, Shillong, Bellary and Manipur.

Pneumonia.

39. The number of cases of dysentery was 2,971 as compared with 3,436 in 1910, and the number of deaths 16 as against 12.

Dysentery and Diarrhœa.

The highest admission rates were reported from Santa Cruz, Jask, Fatehgarh, Hangu, Chitral, Malakand and Bombay, the admission rates in these stations varying between 101 and 50 per thousand. As regards the prevalence of the disease in regiments, 74 cases occurred in the 6th Jat Light Infantry at Secunderabad. These were of a mild type, patients remaining in hospital for only 3 or 4 days, and responding quickly to treatment by sulphates.

Sixty-eight cases occurred in the 104th Wellesley's Rifles at Santa Cruz; this is ascribed to the unsatisfactory state of the water supply.

There were in all 951 admissions to hospital and 3 deaths from diarrhœa, as compared with 1,076 and 5 in 1910.

40. During 1911 there were 1,950 admissions and 4 deaths amongst Indian troops as compared with 2,212, and 4 deaths in the previous year. As has been noted the Southern Army suffers more from this disease than the Northern The highest number of cases were reported from Almora, namely 122, which on the average strength gives a rate of 106 per thousand.

Venereal diseases.

Beri-beri.

41. Admissions for beri-beri rose from 18 in 1910 to 24 in the year under review, the increase being chiefly due to the occurrence of 16 cases in the 61st Pioneers at Secunderabad. The medical officer reports that the outbreak was put a stop to by boiling the rice before it was husked. Five cases occurred in the 83rd Wallajahbad Light Infantry in the same station, which submitted to the same treatment.

Suicides.

42. During the year under review there were 9 cases of suicide, as compared with 10 in 1910 and 113 in the decennium ending 1910. Of these 9 cases, 4 were by gunshot wound, 2 by hanging, 2 by arsenic poisoning, and 1 by opium poisoning.

SECTION III.

GENERAL POPULATION.

43. The chief features of the rainfall and other weather conditions are described as follows in a memorandum furnished by the Meteorological Department of the Government of India.

Meteorology, crops and general conditions.

The precipitation of January and February was much above normal in the greater part of northern India, and below normal elsewhere. The excess in northern India was due to very wet weather in January, February having been unusually dry.

Heavy rainfall occurred in northern India during March and, in spite of the scanty falls of April and May, the total for the hot weather period in this area was well above the normal. Weather in the Peninsula was exceptionally dry.

The monsoon currents were less active than usual except in Burma, Eastern Bengal and Assam, and Bengal, and at one time the drought threatened to prove as serious as that of 1877. A marked improvement occurred about the middle of August, which reduced the deficiency, averaged for the whole of India, to 11 per cent, but affected chiefly the United Provinces and Central India at the expense of the north-west and the Peninsula.

The rains of October to December were on the whole well above normal in northern and central India. The excess was chiefly due to heavy rainfall during the period October 21st to November 20th, December having been unusually dry in the region principally affected by the winter rains.

On the whole, 1911 was drier than usual, the total average rainfall of India having been about 3″ (6 per cent.) below normal. The aggregate rainfall of the cold weather, hot weather, and retreating monsoon periods was well above normal, and the deficiency was due to the weakness of the monsoon. The areas in which an excess was recorded for the year as a whole were Burma, Assam, Eastern Bengal, Chota Nagpur, Bihar, the United Provinces East, the Punjab South-West, Kashmir, the North-West Frontier Province, Baluchistan and the Central Provinces East; while the deficiency was very marked in Gujarat and the Konkan.

Atmospheric humidity and temperature were approximately normal during the cold weather period of the year, while the deviations in the hot weather period were in agreement with those of the rainfall, but were not in general strongly marked. The only noteworthy feature was the prevalence of cooler weather than usual in northern India during the greater part of the hot season, owing probably to the influence of the heavy snowfall of the previous winter months.

The chief meteorological features of the year in the different provinces will be found in the paragraphs which follow, and the monthly figures of temperature and rainfall are given as appendices A and B to this section.

The year opened well with general rain in January nearly all over the country, but the progress of the monsoon currents was weak and fitful and dry westerly winds extending into N.-E. India established a complete break in the rains over almost the whole of India, except Burma. As a consequence agricultural operations were at a standstill, fodder became scarce, prices rose, and the situation became critical. About the third week of August, the monsoon currents revived and gave rain in almost all parts of northern and central India. This timely rain changed the whole aspect, and the year ended with the best of prospects. The outturn of the wheat crops was the largest on record and exceeded the average of the preceding five years by 25·8 per cent. The yield of rice was 6·4 per cent less than in 1910, but 12·7 above the quinquennial average, and the total quantity exported to foreign countries was nearly 52 million hundredweights, or about seven million hundredweights more than were exported in 1910. Sugarcane and oilseeds also gave a good yield, and the former was eight per cent. better than in the year preceding, notwithstanding the fact that a considerable portion of the crop was utilized as food for cattle, owing to the scarcity of fodder.

44. The following table gives the number of births and deaths registered in the several provinces of British India. It should be noted that the ratios given in this table and those relating to the vital statistics of 1911 in the succeeding paragraphs, have been calculated on

Births and deaths.

populations resulting from the census of 1911, except in the case of Ajmer-Merwara where the figures of the census of 1901 have had to be taken as the basis of the calculations. The rates quoted for other periods are those calculated on the previous decennial census.

The births and deaths registered in the several provinces of British India during 1911 are given in the following table:—

Province.	Births.			Total deaths.			Ratio of deaths per 1,000 of population.			Mean death rate during previous five years.		
	Total number.	Ratio per 1,000 of population.	Mean ratio during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.
Bengal	2,099,572	40·01	36·33	93,902	1,621,517	1,715,419	26·91	33·10	32·69	29·36	34·22	33·90
Eastern Bengal and Assam ...	1,149,492	34·59	34·80	13,775	839,703	853,478	18·82	25·83	25·68	20·10	28·77	28·58
United Provinces	2,053,384	43·84	38·63	174,206	1,931,086	2,105,292	56·04	44·16	44·95	46·41	41·95	42·25
Punjab	865,775	43·9	41·6	76,902	595,017	671,919	39·74	33·43	34·05	45·36	43·41	43·61
North-West Frontier Province	71,606	35·1	34·2	4,782	42,776	47,558	25·00	23·12	23·30	29·90	29·95	30·38
Central Provinces	688,432	49·47	52·68	51,285	431,212	482,497	44·94	33·75	34·67	42·85	39·83	40·14
Madras	1,226,488	30·4	32·2	136,267	797,243	933,510	28·2	22·4	23·1	29·9	24·2	24·9
Coorg	4,768	27·25	25·40	488	5,207	5,695	48·89	31·56	32·55	53·50	32·95	34·12
Bombay	705,090	36·00	35·10	100,969	454,343	555,312	36·89	26·96	28·35	39·99	28·74	30·54
Burma {Lower ...	200,947	31·44	33·96	29,094	124,218	153,312	36·35	22·22	23·99	41·03	25·36	27·35
Burma {Upper ...	121,509	34·85	...	14,825	79,545	94,370	50·16	24·93	27·07	42·99	27·51	29·22
Ajmer-Merwara	22,700	47·60	36·61	5,649	15,533	21,182	43·57	44·72	44·41	51·23	36·69	40·48
British India	9,209,703	38·58	37·88	702,144	6,937,400	7,639,544	36·19	31·64	32·01	37·63	34·57	34·85

The fall in the birth rate from 39·52 in 1910 to 38·58 is merely nominal being due mainly to the different populations on which the two have been calculated. The birth rates were higher than the death rates in all provinces except the United Provinces of Agra and Oudh and (as usual) Coorg. The percentage of male to female births ranged from 103·41 in Coorg to 122·5 in the North-West Frontier Province.

The death rate was 32·01 as compared with 33·20 in 1910. The decrease was most marked in Eastern Bengal and Assam, the Central Provinces and Ajmer-Merwara. In every province except Bengal, Ajmer-Merwara and Eastern Bengal and Assam (where most of the "towns" are merely large villages) the urban were higher than the rural death rates.

In the United Provinces, the Punjab, Bombay and Ajmer-Merwara the death rates of females were higher than the death rates of males; but only in the first two provinces was the excess of mortality among females considerable.

It is interesting to note that although the birth and death rates are generally found to move along parallel lines in most of the provinces in India, a high birth rate was not accompanied by high mortality in several areas, notably in Bengal and the Punjab. Calculating the mortality among infants on the number of children born during the year, the mean death rate of male infants worked out to 213·97 per thousand and of female infants 196·00 as compared with 217·21 and 201·17 in 1910.

45. The deaths from the chief diseases in the several provinces are shown in the following table:—

Chief diseases.

Province.	Cholera.		Small-pox.		Plague.		Fever.		Dysentery and Diarrhœa.		Respiratory Diseases.		All other Causes.	
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
Bengal	124,560	2·37	4,741	·09	75,681	1·44	1,081,349	20·60	43,913	·83	15,402	·29	343,649	6·54
Eastern Bengal and Assam.	39,248	1·18	8,350	·25	27	·0008	625,821	18·82	22,600	·69	4,585	·14	141,193	4·24
United Provinces ...	117,689	2·51	1,479	·03	332,301	7·09	1,308,498	27·94	24,135	·51	24,654	·53	272,196	5·81
Punjab	1,260	0·06	5,024	0·25	175,345	8·89	302,417	15·33	11,713	0·59	45,294	2·30	124,104	6·29
North-West Frontier Province.	12	0·01	950	0·47	243	0·12	55,704	17·48	259	0·13	1,399	0·69	8,238	4·04
Central Provinces ...	2,998	·22	1,714	·12	27,938	2·01	234,489	16·85	43,777	3·15	36,351	2·61	128,902	9·26
Madras	58,174	1·4	23,817	0·6	15,185	0·4	298,688	7·4	64,389	1·6	36,711	0·9	426,628	10·5
Coorg	6	·03	297	1·70	57	·33	4,555	26·03	116	·66	67	·38	561	3·21
Bombay	5,817	·30	4,727	·24	100,399	5·13	223,027	11·38	31,549	1·61	51,470	2·63	130,871	6·68
Burma {Lower ...	2,595	·41	5,643	·88	3,906	·61	50,273	7·87	8,148	1·27	5,383	·84	75,234	11·77
Burma {Upper ...	1,596	·46	361	·10	2,154	·62	25,869	7·42	2,471	·71	2,207	·63	58,072	16·66
Ajmer-Merwara ...	50	·10	1,432	3·00	346	·72	16,666	34·95	566	1·19	299	·63	1,593	3·34
British India {1911 ...	354,005	1·48	58,535	·25	733,582	3·07	4,207,356	17·63	253,636	1·06	223,822	·94	1,710,641	7·17
British India {1910 ...	430,451	1·90	51,315	·23	413,355	1·83	4,341,392	19·17	267,672	1·18	234,308	1·03	1,779,541	7·86

Taking British India as a whole it will be seen that the number of deaths under each of the headings tabulated, except under small-pox and plague, were fewer in 1911 than in the preceding year. All the provinces, except Bengal, Eastern Bengal and Assam and the Central Provinces, contributed towards the increase under small-pox. The increase in the number of deaths from plague was caused principally by epidemics in Bengal, the United Provinces, the Punjab and Bombay. The cholera mortality of India was reduced from that of 1910 by nearly 18 per cent. and the number of deaths from "fever" shows a decline when compared with the previous two years.

Bengal.

46. In the first two months of the year the rainfall in Bengal was below the average, but in March and April rain was general. The monsoon broke on the 11th of June. During July and August the rainfall was most erratic, and although it became general in September and October the monsoon rains were deficient everywhere, except in Bihar, the deficiency being most marked in Chota Nagpur.

The birth rate of the year, calculated on the census of 1911, was 40·01 per mille against 39·72 per mille during 1910. The death rate was 32·69 per mille against 33·10 the year before. The highest rates were recorded in Patna (49·18) followed by Shahabad (47·97) and Saran (47·44). For the whole province the death-rate from plague was only 1·44 per mille, but rate of 12·46 per mille was recorded in the Patna district, 8·76 per mille in the Saran district and 6·89 per mille in the Shahabad district. From fever the provincial rate was 20·60 per mille. The number of deaths from plague was 75,681 and from fever 1,081,349 as compared with 46,584 and 1,031,929 respectively in 1910. Inoculation against plague was not carried out to the extent that one would desire, but other measures, such as the evacuation of infected houses (the most popular of all measures among the inhabitants, and one which is followed by excellent results when resorted to sufficiently early) and the destruction of rats, were fairly generally adopted. The death rates from fever were 9·51 per mille in towns and 21·39 in rural areas. The higher mortality rate in rural areas requires no explanation when one considers that the usual Bengal village is buried in thick jungle, that it abounds in pits and holes in which mosquitos can breed, that its water supply is usually very impure and that the soil is frequently saturated with filth. Each of these conditions is receiving the careful consideration of Government, but progress and improvement must be slow until the general population themselves recognise the danger to which these conditions give rise.

A special Deputy Sanitary Commissioner is employed on anti-malarial measures, and the Provincial Committee have recorded their appreciation of much valuable work done by this officer. Quinine was distributed gratuitously by 24 subordinate medical officers, each of whom travelled through his district with a dispensary. The issue on payment of "treatments" of quinine hydrochloride is also reported to have been much appreciated by the people. Although no district was entirely free from cholera during the year, there was a satisfactory fall in the mortality from this cause, *viz.*, from 162,611 in 1910 to 124,560 in 1911, and the death rate from small-pox also fell from ·14 in 1910 to ·09 in 1911.

City and Port of Calcutta.

47. For the City of Calcutta, the year was a very healthy one and the death rate (27·2) is the lowest ever recorded. Of the total number of deaths (24,396) no less than 3,637 or 14·9 per cent. were due to cholera, small-pox and plague, but this proportion is much lower than the average of the past five years, which was 23·3. The mortality from all causes was greatest in the winter months and least during the months of the monsoon. The explanation of this may lie in the fact that large numbers of the people leave the city before the monsoon and return during the winter.

Eastern Bengal and Assam.

48. In Eastern Bengal and Assam the rainfall for the year was seasonable and fairly well distributed. Crops were well up to the average and the year was a remarkably healthy one with no extensive or widespread epidemics. The birth rate rose slightly and the death rate was the lowest recorded in the history of the province. Of the 8,53,478 deaths reported, 625,821 were attributed to fever, and 39,248 to cholera; the ratios of which per 1,000 of the population are respectively 25·68 (all causes), 18·82 (fevers) and 1·18 (cholera) as compared with 33·71, 23·31 and 3·95 in 1910.

A scheme for the systematic investigation of morbidity and mortality in type areas district by district throughout the province is being tested under the direction of the provincial Sanitary Board, and the tests promise to be most interesting and valuable.

United Provinces.

49. In the United Provinces the rainfall was much heavier than usual during the first two months of 1911, but was 33 per cent. less than normal during the succeeding three months. The total precipitation during the monsoon period was markedly in defect, but was much above normal during the last three months of the year. The birth rate rose from 41 per mille in 1910 to 43·84, and the death rate from 38·67 to 44·95. There were 2,105,292 deaths registered in the province as against 1,844,178 during 1910. Of this number 1,308,498 deaths (27·94 per mille) were ascribed to "fever," 332,301 (7·09 per mille) to plague, 117,689 (2·51 per mille) to cholera and 20,277 (0·43 per mille) to measles. The corresponding death rates per mille for these four diseases in 1910 were 27·07, 3·31, 2·15 and 0·14 respectively. The plague epidemic was extremely severe. Only one other epidemic,—that of 1905 when 383,802 deaths were recorded—has yet surpassed it in virulence. Very few districts escaped. As usual March and April were the two months in which most deaths were recorded.

May, November and June were the three months in which the highest mortality from "fever" occurred. The number of deaths ascribed to this cause was greater than in 1910; in spite of this malaria is said to have been less prevalent and it is to the mildness of the malaria epidemic that the local Government attributes the fall of over 30 per cent. in the sale of quinine. An interesting experiment was made in the province of giving a short course of lectures and demonstrations on the causes of malaria and the established facts regarding its prevention and cure at each of the normal schools, so that the teachers who are trained there might be in a position to instruct their pupils in the subject. It is also intended to deliver similar lectures, illustrated by lantern slides, sketches, models and diagrams to the general public at various selected centres.

Punjab.

50. The prolongation of winter conditions in March, delayed the establishment of the hot weather in the Punjab in 1911. The rainfall was much lower than usual, and the price of food rose generally.

The census of 1911, shows that there has been a decline of about four hundred thousand in the total civil population of British districts in the Punjab during the previous decade. This decline chiefly affected the Ludhiana, Ambala, Rohtak, Gurgaon, Amritsar, Jullundur, and Gurdaspur districts and is attributed almost entirely to the effects of plague, which has prevailed continuously in those areas with varying intensity since 1902. The population under registration in the province has not, however, decreased in the same proportion and this number is now 19,731,722 as compared with 20,108,690 in the previous year. Notwithstanding the abnormality of the season in its physical aspects, the year was, on the whole, a healthy one. The births numbered 865,775 and the deaths 671,919, which give ratios of 43·9 and 34·05, as against 42·7 and 33·28 in 1910. Cholera did not become epidemic in the Punjab until towards the third quarter of the year, and the mortality from this disease shows a satisfactory decline from 2,131 in 1910 to 1,260 in 1911. Most of the deaths from cholera occurred during September in the Sialkot district where the outbreak was attributed to the Gullu Shah cattle fair, which was held responsible for the infection of 9 towns and 284 villages and a death roll of 938 persons. The epidemic of plague was more severe in 1911 than in the previous year, and was fairly widespread over the central and southern portions of the province. The disease accounted for 198,669 deaths or 63,186 more than in 1910. The measures taken for its suppression consist as usual in evacuation (which is, however, very unpopular in the greater portion of the province) and inoculation, 131,519 operations having been performed. Everywhere the value of simple hygienic measures is taught to the people, and Government have made it a penal offence for persons from an infected village entering a healthy one against the wishes of the inhabitants of the latter, until they have exposed their belongings to a sun temperature of 116 degrees Fahr. for 45 minutes, which is considered sufficient to kill all the fleas that may be on them. The scanty monsoon rainfall had the merit of reducing the mortality from fevers. The fever death rate fell from 17·10 in 1910 to 15·33, which is 7·62 lower than the quinquennial average and the lowest recorded since 1877.

North-West Frontier Province.

51. Although the total rainfall did not vary appreciably from the normal, its time distribution was bad, as nearly all the rain fell before the end of March and there was none during July and August, when it was much wanted. As in the province of the Punjab, this resulted in a diminished death rate from fevers, which fell from 19·5 in 1910 to 17·48 in 1911, the lowest on record. Altogether the year was a very healthy one. There was no serious outbreak of any epidemic disease. It is unfortunate that, while the general death rate reached the lowest point recorded since 1901, the birth rate should show a decrease of 3 per thousand; this, however, has been attributed to the greater accuracy in the rate secured for 1911 by the publication of the new census figures.

Central Provinces.

52. In the Central Provinces the rainfall during 1911 was below the average in all districts, except Bhandara and Chhattisgarh. A heavy and timely fall in August, however, saved the agricultural situation and on the whole good crops were reaped.

The birth rate of the province was 49·47 per thousand the highest provincial rate recorded in British India during 1911. The rate for 1910 calculated on the census of 1901 was 55·42, but if calculated on the census of 1911 is only 47·67. The total number of deaths was 482,497 or 54,755 less than in the previous year, giving a ratio of 34·67. The decrease is attributed to the low rainfall of the year, which diminished the prevalence of fever and bowel diseases. Unfortunately plague was widely prevalent; but for this the year would have been a prosperous and healthy one. The number of deaths from plague was however slightly lower than in 1910. Of preventive measures against this disease, evacuation, rat destruction and inoculation, are stated to be increasingly popular among the inhabitants. The number of deaths from cholera decreased by nearly 50 per cent. compared with 1910. The cases of cholera were mostly scattered, and the provincial Sanitary Commissioner is sceptical as to the majority being true Asiatic cholera. Fevers accounted for about half the total number of deaths in the province, but the death rate from this disease, 16·85 per thousand, is 4·58 lower than it was in 1910.

Madras.

53. In the Madras Presidency the average rainfall during 1911 was nearly 10 inches less than in 1910, and 5 inches below the average of the past 40 years. This did not, however, affect to any appreciable extent the prices of food grains, which were on the whole easier than during 1910. The total number of births recorded was 1,226,488, showing a decrease as compared with the previous year of 8,681 or 0·2 per mille. The recorded deaths in 1911 numbered 933,510 or about 26,000 more than in the preceding year, and the death rate was 23·1 per thousand of the population according to the census of 1911. The variation in the districts was extreme, from 42·3 in Madras, to 14·2 in Ganjam. The mean percentage of male to female births was the same as last year, 104·7, and of male to female deaths 104·2.

Cholera accounted for 58,174 deaths, a death rate of 1·4 per thousand as against 0·9 in 1910. Deaths from small-pox were reported from all the districts of the presidency, but 13 towns enjoyed complete immunity from this disease and only 3,790 persons died in the remaining 49 towns. The death rate from this disease in rural areas, 0·6 per thousand, was even lower than in towns, 1·4. There was a recrudescence of plague in the presidency during the year, and 15,185 deaths were reported from 17 districts as compared with 4,867 deaths from 15 districts in 1910. The Plague Research Commission commenced an investigation into the causes of the peculiar distribution of this disease in the presidency; their report has not yet been published.

City of Madras.

54. In the City of Madras 19,735 births, 38·3 per mille, and 21,771 deaths, 42·0 per mille, were registered during 1911 compared with 19,340, 37·98 per mille, and 20,312, 39·8 per mille, in the previous year. The infantile mortality calculated on the number of infants born during the year gave a ratio of 305·4 per thousand, as against 294·1 in 1910. The number of deaths from tuberculous disease fell from 954 in 1910 to 760 in 1911; there are no data available as to the extent that tuberculosis prevails in Madras, but, according to current opinion, it is not great. The city was again free from indigenous plague.

Bombay.

55. Owing to the failure of the monsoon in this presidency, the prices of food grains were high, but famine conditions did not prevail and no depressing effect on fecundity occurred. The number of births registered was 705,090, which is 15,389 more than in the previous year, and 88,666 higher than the mean of the decade. The rural birth rate was 37·47 per thousand compared with 26·89 in towns, and 36·00 in the whole presidency. Notwithstanding a severe recrudescence of plague (which disease alone accounted for 100,399 deaths or 18·08 per cent. of the total mortality) the death rate fell from 30·30 in 1910 to 28·35 in 1911, and compares favourably with the decennial mean of 32·63. The comparatively low mortality from cholera observed in last year's report continued during 1911, although the death rate of the latter period is slightly higher than that of the former. There has been a steady improvement in this respect in the presidency due to more hygienic conditions and to the instructions freely circulated among the people as to what they should do when the disease appears in their midst. Small-pox was responsible for a few more deaths than it was in 1910. The Sanitary Department are alive to the necessity of obtaining early information of an outbreak, and concentrating their efforts on the usual preventive measures when a report is received. Owing to the dryness of the season, malaria was less prevalent than usual, and the death rate from fevers fell from 14·26 in 1910 to 11·38 in 1911. During the first quarter of the year, the mortality was high, it fell gradually during the second quarter and from July to the end of the year there was a continuous rise. The usual anti-malarial measures were employed, and great success is predicted for the system of travelling dispensaries recently introduced.

City and Port of Bombay.

56. During 1911 the City of Bombay received the lowest rainfall since 1906. Cholera, small-pox and measles were present in varying degrees of intensity, but plague only was epidemic. The number of births registered was 21,376, the highest on record, but as the census of 1911 has revealed large inter-sectional movements of population, a comparison of the birth rate with any previous year would serve no useful purpose. The number of deaths was 34,961, practically the same as in 1910, 34,933. The male death rate works out to 30·49 per thousand of *sex* population, and the female death rate to 45·50 as compared with the general death rate of the city of 35·6 per thousand according to the census of 1911. The *infantile* mortality continues to be very heavy, 8,120 children under 1 year of age having died during the year. The Corporation have a staff of visiting nurses and midwives who are engaged in visiting the houses of the poorest and most ignorant, explaining in homely language the dangers to which their children are subject, and in attending on as many confinements as possible.

In the Port of Bombay 1,057 vessels, with 205,207 crew and passengers were inspected during the year, as against 1,012 vessels carrying 176,925 crew and passengers in 1910. The number of vessels disinfected was 69, of which 28 were pilgrim ships and the remainder vessels on which cases of infectious disease had occurred. The municipality lent the Port staff a special vaccination establishment which vaccinated 15,140 pilgrims, and it is estimated that more than 50 per cent. of pilgrims to the Hedjaz are thus protected.

Burma.

57. The rainfall throughout most of Lower Burma was higher in 1911 than in 1910, but in Upper Burma it was in defect. The price of rice (the staple food of the province) was higher than the average, and in Lower Burma rose to 6 seers 13 chittacks per rupee in October as compared with the yearly average of 9 seers per rupee.

The birth rate and the death rate, based on the census figures for 1911, among the population (nearly 10 millions) for which vital statistics are registered, were 32·64 and 25·07 per mille, respectively. In 1901, the year of the previous census, the corresponding rates for Lower Burma only were 32·07 and 21·74, and it was then remarked by the local authorities that so low a birth rate was scarcely consistent with probability, and that the figures indicated defective registration.

Small-pox was very prevalent in Lower Burma, and 6,004 deaths from this disease were recorded during 1911, against 1,817 in 1910. The provincial Sanitary Commissioner remarks that epidemics of small-pox in the province appear to take at least 2 or 3 years to exhaust themselves, and he fears that Upper Burma will suffer severely during 1912. The cholera deaths numbered 4,191, or nearly twice the number reported in 1910: of the total, 2,595 occurred in Lower Burma and 1,596 in Upper Burma, showing increases of 761 and 1,419, respectively, on the figures of the previous

year. Plague was responsible for 3,906 deaths in Lower Burma, and 2,154 in Upper Burma. These figures are 511 and 1,170, less than the corresponding figures for 1910. The measures adopted for the prevention of plague were rat destruction, inoculation, and evacuation. Inoculation was not in favour except in 2 or 3 districts of Upper Burma, and evacuation was rarely adopted. In Lower Burma, rat destruction appears to have given the best results. Deaths from fevers numbered 76,142, giving a rate of 7·71 per thousand of population. The provincial Sanitary Commissioner remarks that the returns are of no value, since in rural areas nearly every death is returned under the head "fever."

Coorg and Ajmer-Merwara.

58. In Coorg the number of births was 4,768, 27·25, per thousand, which shows an improvement on the rate of 25·68 for 1910. The number of deaths was 56·95, giving a rate of 32·55 against 37·77 the year before. The deaths from cholera numbered only 6 compared with 56 in 1910. Small-pox was responsible for 297 deaths as compared with 46 in the previous year. There was a decrease of 1,162 in the number of fever deaths, the rates per thousand being 26·03 and 31·65 in 1911 and 1910, respectively.

In Ajmer-Merwara the birth rate during 1911 was 47·60 per thousand of the population against 42·68 in the previous year, and the death rate which had been 50·08 per thousand in 1910 declined to 44·41 in 1911. The deaths from small-pox numbered 1,432 against 78 the year before, the vast majority being reported from the Ajmer district. There were 50 deaths from cholera, of which 42 were reported from Ajmer City in November. Plague and fevers account for 346 and 16,666 deaths, respectively, compared with 6,517 and 15,166 in 1910.

Red Sea Pilgrim Traffic.

59. Between the 11th August and the 19th November 1910, 23 ships, carrying 18,014 pilgrims, left the Port of Bombay for the pilgrimage to Mecca *viâ* Jeddah. Before the pilgrims embarked, the ships were cleansed and freed from rats by means of the Clayton process, and the pilgrims were subjected to a very careful medical inspection and their clothing and bedding to thorough disinfection. Of the 18,014 pilgrims, 8,278 were vaccinated in Bombay before starting, and many of the remainder had been vaccinated before they left their homes. A fully equipped plague observation station, capable of receiving an entire shipload of pilgrims, was established at Perim, and all pilgrim ships were inspected either there or at Aden, in addition to having to undergo the usual observation at Camaran, as required by the Turkish rules. No case of plague or cholera was reported on these ships. On the outward voyage 106 deaths occurred among the pilgrims, the causes being attributed to fever, old age, general debility, etc.

The pilgrims returned to India in 29 vessels between the 7th January and 30th December 1911, and numbered 18,871 in all. The total number of deaths among them was 465, chiefly from old age, general debility, and privation. There were 3 cases of plague, 6 of cholera, and 8 of small-pox in 10 of the returning vessels, and 9 of these vessels were thoroughly fumigated by the Clayton apparatus and the clothing and bedding of 3,915 pilgrims, among whom the cases of plague occurred, were disinfected before they dispersed to their homes.

The Haj report states that an unprecedently large number of pilgrims were attracted this year owing to the Haj having been fixed for a Friday, and that many of the Indian pilgrims remained longer than necessary in order to obtain cheaper return passages, which presumably the steamer companies offer when the bulk of the returning pilgrims have left Jeddah. Close upon a thousand Indians are said to have been lying about the port for weeks in the most abject misery, and many died before the compassion of the Bombay and Persian Steam Navigation Company moved them to send these stranded pilgrims back to Bombay, free of charge. The pity is that instead of their sufferings preventing other pilgrims, who cannot afford the expense of the journey, from undertaking the pilgrimage, reports circulated of the assistance given to stranded pilgrims, encourages those who can afford only the expenses one way, to undertake the journey in the hope that they will be among the number brought back free of cost.

The pilgrims did not suffer severely from plague during their stay in Jeddah and Mecca, but were visited by a severe epidemic of cholera, during which 782 are reported to have died. In the hospital at Jeddah, 442 pilgrims were admitted (causes not specified) during the season and of this number only 32 were discharged as cured.

SECTION IV.

JAILS OF INDIA.

60. It was pointed out in the report for 1910 that the annual fluctuations in the number of prisoners in India are governed to a considerable extent by circumstances of prosperity among the general population, or the reverse, and that the annual fluctuations in the health statistics of the jails are dependent to a great extent upon differences in the physical condition of prisoners at the time of their conviction. The conditions in Indian jails however are far superior to those which exist amongst the general population; as the arrangements for preventing epidemic disease year by year approach more closely to perfection, so the death rate in jails steadily falls, though this is not the case in the general population.

India.

As will be shown by the figures under consideration these influences have clearly been at work during the year under review.

61. The mean daily number of prisoners in India, Burma and the Andamans during 1911 was 109,099; 1,356 less than in 1909; and 872 less than in the decennium 1901—1910. The rates of mortality from all causes fell to 19·09 per thousand from 21·62 in 1910, and 22·57 (1901—1910). Compared with 1910 this decrease is shared by all administrations except Burma and Bombay.

The prison population in 1911. Total sickness and mortality rates.

In India and Burma the mean daily population fell from 98,032 in 1910 to 97,215, the constantly sick rate remained steady at 26 per thousand, and the admission and death rates fell from 549·4 and 19·29 per thousand in 1910 to 537·7 and 18·44 in 1911.

The distribution of rainfall throughout the year was peculiar. The monsoon currents reached the coasts in the first week of June, but their progress inland was weak and fitful—and a complete break in the rains was established over almost the whole of India, excluding Burma. The drought was protracted well into August, agricultural operations were retarded, and standing crops withered over the greater part of southern India. Prices rose and the situation became critical. However in the third week of August the monsoon currents revived, and gave rain in almost all parts of northern and central India. Thereafter more normal conditions prevailed. Viewed as a whole the year was a good one, and the agriculturalist was helped by the high prices which prevailed. The year ended with the best of prospects in the greater part of the country except in portions of the Bombay Presidency, Baroda and parts of Central India. The wheat crop was the largest on record. The influence of these favourable conditions is shown in the reduced average strength and mortality of the prisoners.

The Andamans will be excluded from the following general discussion of sickness and mortality as the conditions of life there differ widely from those in other Indian prisons.

62. The diseases to which the greatest amount of sickness were due were—malaria (admission rate 113·8 per thousand), dysentery (56·6), diarrhœa (38·6) and respiratory diseases (28·3); while the principal causes of death were tubercle of lungs (3·65), dysentery (2·91) and pneumonia (2·37). Excluding tubercle of the lungs there has been a tendency towards lower death rates from all other causes as compared with 1910.

Causes of sickness and mortality.

63. The steady decline in the statistics of this disease is maintained, as will be seen from the following table :—

Malaria.

Admission rates from malaria per thousand of average daily strength.

Province.	1894-1898.	1899-1903.	1904-1908.	1909.	1910.	1911.
Burma	159·5	131·6	45·2	35·5	45·4	44·0
Eastern Bengal and Assam	394·3	315·7	265·8	247·9	173·9	198·3
Bengal	299·2	322·1	304·3	273·8	281·8	254·6
United Provinces	296·3	260·7	226·3	212·1	123·2	94·0
Punjab	680·5	560·5	255·4	139·3	116·0	98·2
North-West Frontier Province ...	819·3	437·1	532·1	504·4	353·1	197·6
Bombay	311·7	241·7	150·2	123·8	96·3	86·8
Central Provinces	273·9	329·5	193·5	151·3	104·8	65·7
Madras	150·4	100·3	73·2	81·0	94·2	64·2
India, excluding the Andamans ...	298·5	238·4	199·5	172·4	134·7	113·8

The death rate was ·96 per thousand as compared with 1·83 *in* 1900. This improvement is extremely satisfactory. The year under review was no doubt a good one, but the general tendency to improvement throughout, specially marked during the last three years, is a high testimony to the energy and care of those in charge of the Department, and to the efficacy of the methods now employed.

Dysentery.

64. Considering the figures for India as a whole there has been a slight decline in this disease, the admission rate falling from 57·7 per thousand in 1910 to 56·6 per thousand in 1911, and the death rate from 3·46 to 2·91. The highest figures of admission rate are those for Eastern Bengal and Assam (223·7 in 1911 as compared with 202·4 in 1910, *i.e.*, an increase of 21·3 per thousand). In the Central Provinces the death rate was 11·47 as compared with 16·26 in the previous year, and 4·95 in the decennium 1901-10. Further details of the relative incidence of the disease are given in the paragraphs on the several administrations. The heaviest admission rate occurred in July.

Tubercle of the lungs.

65. In view of the fact that the year was one of health and prosperity in India as a whole, the figures for tuberculosis are disappointing. The admission rate for India and Burma rose from 8·7 to 10·5 per thousand and the death rate from 3·41 to 3·65. Thus this disease has not shared in the general amelioration. Increases in admission rate are shown in the figures for all provinces except Eastern Bengal and Assam, and the North-West Frontier Province. In the former, in spite of overcrowding, the admission rate fell from 13·0 to 12·2 and the death rate from 6·45 to 5·00. The most noteworthy increases are in the Punjab (admission rate from 18·3 to 24·9), in Madras (from 9·4 to 13·1) and in the Central Provinces (from 10·3 to 13·4). The importance of overcrowding as a causative factor is fully realised, and precautions are being taken throughout the provinces against its occurrence.

Cholera.

66. There were only 19 cases of cholera with 10 deaths as compared with 42 cases and 23 deaths in 1910, and 201 cases and 111 deaths in 1909. The jails in the Punjab, North-West Frontier Province, Central Provinces, Bombay and the Andamans were entirely free from the disease.

Small-pox. Enteric fever.

67. There were 43 cases with 3 deaths from small-pox as compared with 27 cases and 3 deaths during the previous year. The number of admissions from the disease was highest in Bombay and Burma—12 in each. There were in all 86 cases of enteric fever as compared with 87 in the former year.

68. Figures of the daily average strength of prisoners show a very considerable reduction from those of the crowded years of 1908 and 1909. The decrease has been continuous from 15,565 in 1908, to 13,274 in 1911. Overcrowding which had been serious in 1908, 1909, was almost absent and the general health of the prisoners was unusually good.

Bengal.

The admission rate fell from 876 per thousand in 1910 to 836·6, the constantly sick rate from 36 to 34 and the mortality rate from 18·36 to 17·85. The total number of deaths was 237. The following figures taken from the Inspector-General's report are of interest as showing the great progress which has been made in jail sanitation:—

	Death rate per mille.
1875-79	65
1880-84	61
1885-89	44
1890-94	36
1895-99	26
1900-04	26
1905-09	24
1910	18·36
1911	17·85

The reduction in dysentery cases which was so marked last year is maintained. There were only 48 deaths from this disease of which 9 occurred in the Hazaribagh central jail; but even as regards this jail the drop from 21 in 1910 to 9 in 1911 is very satisfactory.

The admission rate from malaria was 254·6 as compared with 281·8 in the previous year, and the death rate fell from 1·43 to 1·28 per thousand of the average daily strength. The system of placing new comers in a quarantine ward, and treating them with quinine has given very satisfactory results, especially where the neighbouring population was suffering heavily.

The incidence of tuberculosis was less than in the previous year—120 cases and 35 deaths as compared with 105 cases and 46 deaths. The improvement as compared with the years 1908 and 1909 in which there were 78 and 68 deaths, respectively, is marked, and is probably due to improvement as regards overcrowding.

69. Whilst the incidence of sickness shows a considerable increase as compared with the previous year, the death rate was less than in 1910. The admission rate rose from 793 per thousand to 905. The death rate fell from 34·16 to 33·65. Owing to the steady increase in the jail population (6,733 in decennium 1901-1910, 7,436 in 1910, 7,399 in 1911) there was considerable overcrowding, and to this the general ill-health, and high death rate among the prisoners is to some extent due, but in the opinion of the Inspector-General the special unhealthiness of the year in Assam is the paramount factor. This declared itself mainly in an excessive incidence of dysentery, malaria, scurvy, tubercle and epidemic dropsy. For dysentery the admission rate rose from 202·4 to 223·7 and the death rate from 7·93 to 9·06.

Eastern Bengal and Assam.

For malaria the admission rate rose from 173·9 to 198·3, and the death rate from 2·42 to 2·97.

An epidemic of scurvy and pyorrhœa alveolaris occurred at Sylhet, which was responsible for 35 deaths, as compared with 18 in the previous year.

Out of a total of 90 cases with 37 deaths from tubercle of the lungs (as compared with 97 cases and 48 deaths in the previous year), 26 cases and 19 deaths occurred in Dacca and 16 cases and 6 deaths in Mymensingh.

The jail at Gauhati was very unhealthy, the total number of deaths being 32 as compared with 20 in 1910—of these 12 were from dysentery, 5 from malignant malaria and 3 from epidemic dropsy.

70. The average daily strength of prisoners fell from 25,362 in 1910 to 23,932 in 1911. The death rate was 14·62 per thousand which, the Inspector-General believes, is the lowest ever recorded in the province. The admission rate was 442·6 as compared with 461·7 in 1910, and 642·4 in the decennium ending in 1910. The health of the prisoners throughout the year was very good. Cholera though very prevalent in the province, was practically unknown in the jails, there being in all only 5 cases of the disease. Dysentery showed a slight increase, the admission rate rising from 25·8 per thousand to 32·1, and the death rate from 1·85 to 2·13. The greatest increase was in the Gorakhpur jail, where 67 cases with 7 deaths occurred, in comparison with 28 cases and no death in the previous year. This increase is ascribed to the indifferent health of prisoners on admission to jail. Admissions for malarial fever fell from 123·2 to 94 per thousand. Tubercle of the lungs was slightly more prevalent than in the previous year, the admission rate rising from 6·3 per thousand to 7·4, and the death rate from 2·37 to 2·80. The Inspector-General remarks that the disease is somewhat more prevalent among prisoners than among the free population, and that the increase in cases as compared with the previous year occurred even in jails in which there was no overcrowding.

United Provinces.

71. There was a slight increase in the average strength in this province, the figures being 11,910 as compared with 11,875 in the previous year. The accommodation available during the year was for 14,470—an increase of 70 on the figure for the previous year. This sufficed for the daily average population, but was frequently insufficient for class distribution, and was always insufficient for the central jail population. The Inspector-General states that, "the possible connection of this overcrowding (in central jails) with the spread of tubercle is most fully realised." Steps have been and are being taken to ameliorate this condition in the three large central jails.

Punjab.

The admission rate from all causes rose from 575·7 per thousand in 1910 to 631·0 per thousand in the present year, whilst the death rate fell from 28·63 to 27·04. The death rates in the central jails at Montgomery, Lahore and Multan were 29·53, 43·56 and 35·96 per thousand, whilst in the district jails at Ambala and Delhi the rates were 47·11 and 41·44.

Tubercle of the lungs caused 297 admissions and 86 deaths, as compared with 217 cases, and 78 deaths, in the previous year—and the great increase in admissions is principally due to the Montgomery central jail in which the cases rose from 37 in 1910 to 138 in 1911. This is attributed by the Inspector-General to the divergent diagnosis of different medical officers, many of these reported cases being finally discharged as no longer suspicious. The matter will be taken up in a special report by Major W. C. H. Forster, I.M.S. The admission rate from dysentery fell from 46·6 per thousand in 1910 to 39·5 and the death rate from 3·87 to 2·02.

72. The average daily strength rose from 1,436 to 1,594 in 1911. The health of the jail population was particularly good. The death rate of 11·29 was less than half that of the previous year (23·68) and is the lowest rate yet recorded among the jail population of the province. The Inspector-General calls attention to the fact that the death rate per thousand of the free population was 23·3. The malarial rate was particularly low; admission rate per thousand fell from 353·1 in 1910 to 197·6 in 1911.

North-West Frontier Province.

As regards dysentery the same improvement is apparent, the admission rate falling from 71 to 32 per thousand, and the death rate from 1·39 to zero. The death rate from tubercle of the lungs fell from 2·79 to zero, and the admission rate from 7·0 to 2·5.

73. The health statistics of the prisoners in the Central Provinces continued to be unfavourable, the constantly sick rate being 22 per thousand as compared with 21 in 1910 and 23 in the previous decennium. The death rate was 31·32, as compared with 36·52 in 1910, and 21·01 in the decennium 1901-1910. The admission rate for dysentery rose to 95·9 per thousand as compared with 87·3 in the previous year, but the death rate fell from 16·26 per thousand in 1910 to 11·47 in 1911. This

Central Provinces.

increase is principally due to an epidemic in the Raipur central jail, which commenced in the previous year. The monthly figures in the inset show that this epidemic has at length been checked, the admissions falling to zero in December. As was pointed out in last year's report this epidemic is believed to have been due to the admission into the jail of two batches of prisoners from the Bastar State. For safety these prisoners had been spread over different parts of the jail, and it was thought that from some of those who were affected with dysentery before their arrival the disease was communicated by direct or indirect contact. The epidemic reached its acme in August 1910, when there were 49 admissions; during the winter months the disease decreased but never fell below 5 admissions per month. In August 1911 admissions had risen to 54; in September there were 22, in October 49. In November they had declined to 4, and in December to zero. The Inspector-General reports that "strenuous efforts were made to combat the disease, and a specially trained assistant-surgeon was transferred as Superintendent in order to introduce Major Forster's anti-dysenteric vaccine." "And later at my inspection in November 1911, I found that Assistant-Surgeon Rodger's efforts were beginning to take effect. He reports very favourably on Forster's vaccine. He has also improved the sanitation where necessary, and it is a matter of congratulation to him that for the last two months of the year there were few cases and no deaths from dysentery. As regards Forster's vaccine, Mr. Rodgers states that it was in the matter of relapses that the vaccine treatment showed the best results, for whereas relapses were of common occurrence previously, only one case relapsed after inoculation, and this was proved to be a flagellate dysentery."

Admissions from dysentery in the Raipur central jail in 1911.

January	...	15	July	...	44
February	...	17	August	...	54
March	...	26	September	...	22
April	...	5	October	...	49
May	...	13	November	...	4
June	...	3	December	...	0

In these provinces the admission rate from malaria fell from 104·8 per thousand in 1910 to 65·7 in the year under review.

Madras.

74. With the exception of tubercle of the lungs, a universal improvement in all diseases occurred. The health of the jails in this Presidency in 1910 was reported to be "very good," and this year shows a further improvement; in the admission rate, a fall from 451·1 to 415·6; in the death rate a fall from 15·25 to 13·83. The constantly sick rate was maintained at 21 per thousand. The Inspector-General notes that "the improvement in the statistics for the year, was entirely due to the better results achieved in the larger penal institutions where conditions affecting health are more susceptible of control."

The admission rate for dysentery fell from 49·1 to 33·5, and the death rate from 3·88 to 1·69, an improvement which is ascribed to improvement in general sanitation. A similar improvement occurred in malaria where the admission rate fell from 94·2 to 64·2. As regards tubercle of the lungs (in which there was a rise in the admission rate from 9·4 to 13·1, and in the death rate from 2·65 to 3·18), as the special wards provided at Bellary and Trichinopoly for the treatment of patients suffering from this disease have been found to be insufficient, an additional ward is in course of construction at Trichinopoly and a spare building is about to be added to the accommodation at Bellary.

Bombay.

75. The death rate for the year was 18·73 as compared with 14·62 in the previous year; both the daily average sick and the total admissions to hospital were less than in 1910, though the daily average strength was higher. In several jails there was constant or temporary overcrowding, which was relieved as far as possible by transfer, and by housing the surplus population in open sheds.

The admission rate fell from 511 per thousand in 1910 to 429·5 in 1911, the constantly sick rate from 25 to 22. Cholera was entirely absent, and only two cases of plague occurred. There were 32 admissions and 17 deaths from tubercle of the lungs as compared with 25 admissions and 8 deaths in the previous year.

The admission rate from dysentery fell from 43·9 to 31·1 per thousand in the present year, although the death rate showed a slight increase.

Burma.

76. The general health of the prisoners has continued to be very satisfactory, showing only a very slight alteration on the figures of 1910. The admission rate, death rate and constantly sick rate being for 1911, 307·3, 12·28 and 15, as compared with 309·1, 11·98 and 15 in the previous year. If the rates for particular diseases be compared, it will be seen that this uniformity is shared by all of them. In Rangoon the admissions from dysentery rose from 13 to 38, and deaths from 2 to 4, but the Superintendent states that most of the cases were slight, and that many occurred in those addicted to the use of morphia and opium. The amœbic form of the disease was diagnosed in 13 out of the 38 cases. At Mandalay there were only 4 admissions for malaria, which is the more remarkable, as the disease was largely prevalent among troops in the immediate vicinity. The anti-malarial measure employed was isolation of those found to harbour parasites in their blood. Quinine was not given as a prophylactic, nor were mosquito curtains used. There were no breeding places containing anopheline larvæ inside the jail area, and the fact that the jail remained uninfected, although a severe epidemic was raging without its walls, is ascribed to general sanitation, and to the absence of anopheline mosquitoes.

Andamans.

77. The total rainfall in the Andamans during 1911 was 105·8 inches, compared with 114·12 in 1910, and an average of 127·06 in the preceding 5 years. The average daily strength of prisoners was 11,884, as compared with 12,423, in 1910, and 13,518 in the decennium ending 1910. There was no overcrowding. The health of the convicts shows a very satisfactory improvement; the admission rate fell from 1,566·3 per thousand in 1910, to 1,249·8; the death rate from 40·01 to 24·40, and the constantly sick rate from 90 to 62. The low mortality rate is ascribed by the Senior Medical Officer to the reduced prevalence of malaria. From malaria there were in all 8,086 admissions to hospital as compared with 12,362 in the previous year, giving an admission rate of 680·4 and 995·1 respectively. The death rate from this disease fell from 5·07 to 2·02 per thousand. The disease was most prevalent in the months of May, June, July and August. No prophylactic quinine was given in the Settlement, but during the first seven months of the year it was issued in the jails, where the convicts are under closer supervision. The Senior Medical Officer is in favour of drainage operations in the more crowded part of the colony and is doubtful of the efficacy of drug prophylaxis. A report on malaria in the Andamans by Brevet-Major S. R. Christophers has been published as a Scientific Memoir.

Dysentery was less prevalent than in the previous year, the admission rate falling from 98·3 to 93·8 per thousand, and the death rate from 7·41 to 3·70.

The admission rate for tubercle of the lungs fell from 14·7 to 5·8 and the death rate from 8·53 to 5·22.

SECTION V.

VACCINATION.

78. During the year 1911-12, there were performed in British India a total of 9,684,249 vaccination operations, compared with 9,081,194 during 1910-11, an increase of 603,055 operations. There was an increase in every province, except Coorg which showed a decrease of 2,785. The largest increase occurred in Eastern Bengal and Assam, where the combined work (shown separately in the appendices to this section) was greater by 130,302 operations than in the previous year. The increase in the Punjab was 127,214, Burma 104,366, the United Provinces 70,325, Madras 56,793, Bombay 39,801, the Central Provinces and Berar 28,068, the North-West Frontier Province 26,236, Bengal 19,626 and Ajmer-Merwara 3,114.

Vaccination in India.

Comparing the results of the two classes of work—primary cases and revaccinations—the results were better in 1911-12 than in 1910-11. Of primary cases there were 8,780,525 against 8,286,600, an increase of 493,925 in 1911-12, and of revaccinations there were 903,724 against 794,594, an increase of 109,130. Every province showed an improvement in primary work, except Coorg where there was a decrease of 935 cases; and in revaccinations all the provinces showed better results, except three in which the decreases were—Madras 30,519, Bengal 26,079, and Coorg 1,850. No specific reason is assigned for the smaller number of revaccinations in Madras, nor in Coorg, but in Bengal the reason is said to be the lesser prevalance of small-pox during the year.

With the increase of vaccination work, the quality of it also improved: the percentage of success in primary cases was 96·34 compared with 96·24, and in revaccinations 72·82 compared with 70·40 in 1910-11. In the former the ratio ranged between 99·26 in Bengal and 89·7 in Madras—both higher rates than the year before, and in the latter between 83·66 in the North-West Frontier Province and 51·18 in Bombay—both lower rates than the previous year.

The mean number of operations performed by each vaccinator rose from 1,467 in 1910-11 to 1,584 in 1911-12, the figures ranging from 3,376 in the North-West Frontier Province and 3,170 in the Punjab, to 1,181 in Bengal and 1,108 in Ajmer-Merwara.

At dispensaries, in common with the general increase, there was a rise in the number of operations, from 147,673 in 1910-11 to 149,629 in 1911-12, but, except in Bengal, where the work done at dispensaries is not distinguished in the returns from that performed by vaccinators attached to municipalities and by railway staff, the work carried out at these institutions is not great.

The ratio of successful vaccinations per thousand of population, which had been 35·55 in 1909-10, and 35·06 in 1910-11, increased to 37·22 in 1911-12, the extremes being 66 in Coorg—the highest, and 28·64 in Bombay,—the lowest.

On a hypothetical birth rate of 40 per thousand of the population, the percentage of infants afforded protection by successful vaccination was 48·01 which is higher than the highest rate previously recorded, *viz.*, 46·44 in 1910-11. The rates are however marked, as usual, by great variations and ranged between 69·18 per cent. in the Central Provinces and Berar and 65·79 per cent. in the Punjab—the highest, and 19·02 per cent. in Burma and 8·54 per cent. in Coorg—the lowest.

The aggregate cost of the department which had been Rs. 15,04,523 in 1910-11, increased to Rs. 15,61,261 in 1911-12, but the average cost of each successful case fell from three annas to two annas and ten pies, ranging between eight annas and nine pies in Bombay and one anna and seven pies in Bengal (excluding Assam).

79. As usual, particulars regarding the description of vaccine lymph employed and the sources of supply, will be found in the succeeding paragraphs relating to the several provinces. An experiment was conducted at the Shillong vaccine depôt which explains

Vaccine Lymph.

the cause of the reported failure in the potency of lymph supplied in October and November in previous years. A new vaccine depôt is being constructed at Lahore, and a scheme is under consideration for the establishment of a Central vaccine depôt for the Central Provinces and Berar.

Bengal.

80. The total number of vaccination operations performed in Bengal during the year 1911-12, rose to 2,054,756 from 2,035,130 in the preceding year. Of the total, 1,974,927 or 45,705 more than in 1910-11 were primary cases, and 79,829 or 26,079 less were revaccinations. The percentage of successful primary cases and revaccinations was 99·26 and 59·67, respectively, against 99·07 and 62·06 the year before. Compared with the previous year there was an increase of operations in 17 and a decrease in 16 districts. The increase is specially noticeable in the districts of Khulna (17,486), Cuttack (14,823) and Balasore (6,317), and the decrease in Ranchi (8,986), Midnapore (8,016) and Sonthal Parganas (6,297). The better work in Khulna was due to the employment of a larger staff of vaccinators, and in Cuttack and Balasore was attributed to the zeal shown by the inspecting staff in pushing vaccination. The decreases are explained by the lesser prevalence of small-pox, the cessation of the practice of issuing notices to defaulters and probable slackness among the inspecting staff.

On an estimated birth rate of 40 per thousand of the population, 51·93 per cent. of the children were protected, the same figure as last year. In municipalities 80·2 per cent. of the infants under one year of age were successfully vaccinated against 77·3 per cent. the year before.

The following table shows the results under each method of vaccination employed :—

Method of vaccination.	Primary cases.		Revaccinations.	
	No.	Percentage of success.	No.	Percentage of success.
Calf lymph (direct from calf)	44,062	99·33	9,553	80·72
,, Lanoline paste	1,480,476	98·70	68,892	49·54
Arm-to-arm	450,389	99·38	1,384	63·15

During the year 1,973 calves were vaccinated at the Calcutta vaccine depôt and 568,113 grains of lymph were manufactured, against 2,194 calves vaccinated and 608,916 grains of lymph manufactured during the previous year.

The total cost of the department during the year amounted to Rs. 199,666 against Rs. 168,436 in the previous year, and the average cost of each successful case was one anna and seven pies.

Eastern Bengal.

81. Owing to the administrative changes introduced on the 1st April 1912, the vaccination statistics for the Eastern Bengal districts for 1911-12, have been rendered separately from those of Assam.

The total number of operations performed in these districts during the year was 1,209,445 of which 1,115,741 were primary cases and 93,704 revaccinations. There is little dispensary vaccination in the Eastern Bengal districts and only 2,596 operations were performed at such institutions.

Of the 15 districts, increases were reported from 11. The increase was most marked in Bakarganj (25,512), Mymensingh (21,628), Noakhali (17,743), and Chittagong (17,164). Of the districts which showed a decrease, the more noticeable were Dinajpur (9,021), Bogra (7,091), and Malda (6,332). In Dinajpur the

decrease was due to a large falling off in the number of revaccinations during the recess, and in Malda it was accounted for by a severe and extensive outbreak of fever which rendered vaccination in the southern thanas extremely difficult. The percentage of successful primary operations was 96·10 and of revaccinations 75·36.

On an estimated birth rate of 40 per thousand, 42·28 per cent. of the children available were protected. Of the 11,904 infants in compulsory areas, 6,597 or 55·41 per cent. were successfully vaccinated.

Glycerinated vaccine lymph manufactured at the Shillong vaccine depôt was used.

The cost of the department during the year amounted to Rs. 54,652 and the average cost of each successful vaccination was nine pies.

82. The total number of vaccination operations performed in the province during the year was 305,845 of which 290,915 were primary cases and 14,930 revaccinations, against 257,693, 249,955, and 7,738, respectively, the year before. This increase of 48,152 operations consisted of 40,960 primary cases and 7,192 revaccinations. Increases occurred in five districts, *viz.*, Sylhet (28,356), Kamrup (13,977), Khasi and Jaintia Hills (2,288), Goalpara (3,041), and Garo Hills (1,518). The increase in Sylhet was due to the employment of several vaccinators during the rains when small-pox was prevalent and also to the employment as an experiment of 11 extra licensed vaccinators. In Kamrup the increase was due to the increased activity of the vaccination staff in the presence of small-pox. It is satisfactory to note that 5,350 "Mahapurushias" who are generally opposed to vaccination, were vaccinated during the year; none were vaccinated in the previous year. In Nowgong, the Deputy Commissioner afforded considerable help in overcoming the opposition of the people. No marked decrease was reported from any of the districts. Dispensary vaccinations are principally confined to the Hill districts and the Manipur State; in these institutions 1,678 vaccinations were performed against 2,931 the previous year. Excluding unknown cases, the percentage of success in primary cases and revaccinations was 98·14 and 80·98, respectively.

Assam.

On an estimated birth rate of 40 per thousand, 21·98 per cent. of the children were protected. In areas where the Vaccination Act is in force, 79 per cent. of the children under one year of age were successfully vaccinated against 57 per cent. in the previous year.

During the year the India Vaccination Act XIII of 1880 was replaced by the Bengal Vaccination Act V of 1880 in certain districts.

The vaccine lymph prepared at the Shillong depôt was of excellent quality throughout the year. The total number of tubes loaded was 1,716,938 against 1,781,075 in 1910-11.

With regard to the vaccine lymph prepared at the Shillong depôt, the Sanitary Commissioner of the late province of Eastern Bengal and Assam refers in his report on the Eastern Bengal districts to an experiment made in consequence of reports of widespread failures in vaccination with lymph supplied in October and November of previous years. The Deputy Sanitary Commissioner, Captain T. C. McCombie Young, I.M.S., was deputed to the Belgaum vaccine depôt, and on his report proposals for the reconstruction of the depôt were submitted to Government. On his advice measures were adopted to increase the vitality of the vaccine and were attended with most beneficial results. In the Assam report it is explained that the failure of the lymph was due to one or both of two causes—first a decrease in the potency of the lymph strain, and second to exposure to heat during the interval between issue and use. To remedy the first, endeavour was made to exalt the potency of the lymph by passage of the strain through a rabbit before being reinoculated on calves. As to the second, lymph was packed in flasks made on the "Thermos" principle, and sent to the provincial laboratory at Dacca where it was packed in ice and sent out to vaccinators by post in weekly supplies. The result of the experiment showed that if suitable measures are employed to ensure the potency of the lymph by careful selection of vesicles and passage through an alternative vaccinifer, no special arrangements of packing, despatch and distribution are necessary to prevent October and November failures in vaccination.

The total cost of the department amounted to Rs. 64,501 and the average cost of each successful case was three annas and eight pies.

United Provinces.

83. The total number of vaccination operations performed in the United Provinces during 1911-12 was 1,494,557 as compared with 1,424,232 in the previous year. Of the total 1,391,266 were primary cases and 103,291 revaccinations, against 1,343,397 and 80,835, respectively, in 1910-11. The percentage of success in primary cases and revaccinations in which the results were known was 97·65 and 78·13, against 97·74 and 79·13, respectively, in the previous year. There was an increase in the number of operations, but a slight decrease in the percentage of success. Of the 48 districts, an increase in the number of successful primary vaccinations was reported from 33. The greatest increase was in Bareilly (6,167), followed by Meerut (5,754) and Gorakhpur (5,142). Among the districts showing a decrease, the most conspicuous was Basti with a fall of 2,485. In Saharanpur and Jalaun which also showed decreases of 924 and 456, respectively, there was however a great increase in the number of successful vaccinations. Very little vaccination work is done at dispensaries, only 384 vaccinations against 279 in the preceding year.

On an estimated birth rate of 40 per thousand, 50·28 per cent. of the children were protected, compared with 46·98 in the previous year. The total number of successful vaccinations performed on children under one year of age in municipal towns was 80,455 against 78,689 in 1910-11.

At the bovine lymph depôt at Patwa Dangar, 387 calves (264 cow and 123 buffalo) were operated upon, of which 370 (252 cow and 118 buffalo) proved successful against 180 and 175, respectively, in the preceding year. The total quantity of crude lymph obtained was 9,335·6 grammes against 5,983·9 grammes in 1910-11—the average yield per cow-calf being 19·9 grammes and that per buffalo-calf 36·6 grammes against 30·0 and 42·5 grammes, respectively, in the preceding year. The reason for a decrease in the quantity of lymph obtained per calf was explained in last year's report, and was also due to the further limitation of the vaccination area in calves, as it was found that vesicles high up on the loin gave inferior lymph. The contractor also supplied weak and emaciated calves which gave a low return of lymph. As no other calves were obtainable these inferior animals had to be employed to maintain a constant supply of the vaccine. From the crude lymph obtained during the year, 50,910·8 grammes of glycerinated lymph and 1,606·3 grammes of glycerine paste were prepared. There being no demand for lanoline paste none was manufactured.

During the year there was a decrease in the issue of lymph in glass capillary tubes and an increase of the supply in bulk. This was due to the introduction of the method of supplying lymph in metal collapsible tubes which are cheaper and reduce labour. Arm-to-arm vaccination has now been replaced by vaccination with calf lymph in 22 districts and during the ensuing season it is proposed to extend the supply to 11 additional districts, bringing the total to 33, of the 48 districts of the United Provinces.

Glycerinated calf lymph was supplied to all District Superintendents of Vaccination, as usual, in time to start the seasonal work and the vesicle was established in almost all districts on due date.

The total cost of the department during the year amounted to Rs. 1,53,200 against Rs. 1,69,758 in the previous year. The average cost of each successful case was one anna and seven pies or the same as in 1910-11.

Punjab.

84. In 1911-12 there was for the second year in succession an increase in the number of vaccinations in the Punjab. A total of 892,289 operations were performed against 765,075 in the previous year, an increase of 127,214 operations. Of the total 701,700 were primary cases and 190,589 revaccinations compared with 636,697 and 128,378, respectively, in 1910-11. The increase is mainly attributable to increased demand which was noted in many towns and districts during the year.

The experiment of house-to-house vaccination was again carried out and 105,400 operations were performed in this manner. The system is appreciated in three

districts, but in others it has not proved a success, due partly to interference with the privacy of the people, and partly to the delay and consequent wastage of the time of vaccinators. Experience shows that a much larger staff would be required to perform vaccinations by this system. Moreover in house-to-house vaccination there is more exposure of the lymph to the sun, resulting in less satisfactory results. It has therefore been decided that the system should only be continued in places where there is a distinct demand for it, and where either it can be carried out without any increase to the ordinary establishment, or where the local authority is prepared to meet the extra expenditure.

The percentage of success in primary cases and revaccinations in which the results were known was 95·03 and 71·85 against 97·20 and 73·21, respectively, in the previous year. The decline in the percentage of success in primary vaccinations is considered by the Deputy Sanitary Commissioner to be chiefly due to faulty technique on the part of vaccinators, but the provincial Sanitary Commissioner also inclines to the view that it is partly due to certain difficulties recently experienced in the preparation of lymph at the vaccine institute. Both causes are receiving attention.

On an estimated birth rate of 40 per thousand, 65·79 per cent. of the children were protected, compared with 61·42 in the previous year. In municipal towns in which the Vaccination Act is in force, 86 per cent. of the children under one year of age were successfully vaccinated as compared with 64 per cent. in those towns in which it was not in force, the corresponding rates for the previous year being 72 and 62 per cent.

The vaccine institute supplied vaccine lymph to all the districts in the Punjab and to 27 Native States, and in addition issued supplies to the North-West Frontier Province, Baluchistan, Kashmir, Nepal and Afghanistan, to military medical officers in the Punjab and elsewhere, and to private persons.

The old Thaggi jail buildings in which the Punjab vaccine institute was located are being demolished for the erection of a new building on the same site.

The total cost of the department in 1911-12 was Rs. 1,24,320, an increase of Rs. 3 244 on that in 1910-11. The average cost of each successful operation was two annas and eight pies against two annas and ten pies.

North-West Frontier Province.

85. The total number of vaccination operations performed in the North-West Frontier Province during the year was 112,579 primary and 21,223 revaccinations, against 99,719 and 7,847, respectively, in the previous year, an increase of 12,860 in the former class and 13,376 in the latter. The largest increase in both classes of work was recorded in the Bannu district which can only be explained by increased efforts of the vaccination staff. The improvement in revaccination figures is said to be due to a growing belief in the measure.

The total number of vaccine operations performed in the Agencies was 12,130, an increase of nearly 2,000. For the first time the Khyber Agency records vaccination work, 407 persons having been operated on. Vaccination in the Agencies is gradually becoming more popular and the old system of inoculation is dying out. In Swat, an inoculator, a Mullah, consented to learn how to vaccinate: he has taken to it enthusiastically, and has been entertained as a district vaccinator. The desirability of employing existing inoculators as vaccinators is borne in mind and such men are entertained where available. At the Mastuj dispensary in the Chitral Sub-Agency, a larger number of vaccinations was done than at any other dispensary. This has been the case for the past few years and the number recorded now (1,056) is the highest yet reached. At Mardan and at one of the branch dispensaries in Peshawar, a small number of vaccinations was recorded. The attitude of the people towards vaccination is not one of hostility, but there is the usual amount of apathy, laziness, and of disinclination to be annoyed. The principle involved and protection conferred is well understood, and it is always noted that if small-pox is looming on the horizon, the vaccination returns go up considerably. It is considered inadvisable to attempt to enforce the Vaccination Act in the province; the steady increase in the work is regarded as proof that the people are beginning to appreciate the benefits of the proceeding. The percentage of successful primary cases

and revaccinations in which the results were known was 98·74 and 83·66 against 99·06 and 72·95, respectively, in the previous year.

On an estimated birth rate of 40 per thousand, 50·88 per cent. of the children available were protected compared with 69·21 in the previous year. The number of children under one year of age in the towns successfully vaccinated exceeded the number calculated to be available, and this is no doubt explained by the fact that children not born in the towns were brought in for vaccination.

Throughout the year glycerinated chloroformed lymph obtained from the vaccine institute, Punjab, was used and gave good results.

The total cost of the department during the year was Rs. 15,493, and the average cost of each successful vaccination amounted to two annas, as compared with Rs. 14,266 and two annas and three pies, in the previous year.

Central Provinces and Berar.

86. During the year 1911-12, the total number of vaccination operations in the Central Provinces and Berar was 682,177, as compared with 654,114 in the preceding year: this increase of 28,063 occurred both in the Khalsa (13,034) and the Feudatory States (15,029). Though the increase in the British districts was comparatively small, it is said that in many districts a satisfactory amount of work was done in spite of plague which prevailed throughout the season. There were increases in 14 districts, the principal being Nagpur (3,990) and Balaghat (3,198). Decreases occurred in eight districts, the largest being in Jubbulpore (6,255). The presence of plague explains the decreases, except in Bilaspur (177) where it is ascribed to the discontinuance of the practice of collecting children at certain centres for vaccination. Among the Feudatory States eight showed an increase, the Bastar State returning the largest number, *viz.*, 20,176, while decreases occurred in seven. Of the total number of vaccinations,—the figures in brackets are for the preceding year—the primary operations were 511,131 (501,123) in British districts and 82,697 (75,329) in Feudatory States, and revaccinations, 68,651 (68,137) and 11,935 (3,673) respectively. Owing to the prevalence of small-pox in some places, Assistant Surgeons were given orders to do vaccination work, some other medical officers and private practitioners volunteering for the duty. The percentage of success in primary vaccination was 98·89 and in revaccination 78·48 against 98·71 and 73·92, respectively, in 1910-11.

The systematic inspection of school boys in all dispensary towns was begun in 1911, but so far the method has not been thoroughly applied. It was found in one important town that 12 per cent. of the boys were entirely unprotected, and in another 20 per cent. badly pock marked. It is thought that the rules in the existing Education Manual on the subject, if carefully observed, would meet the circumstances. In Raipur and Mandla active opposition on the part of school masters formed the subject of enquiries. In connection with the improvement of vaccination in the province, the provincial Sanitary Commissioner lays stress on a suggestion made by the Deputy Commissioner of Bhandara that vaccinators should be provided with small tin cases for their instruments, etc. In the Nagpur Municipality such cases have been provided which are not only handy, but contain a sterilising apparatus. A serviceable scratcher introduced by Lieutenant-Colonel Buchanan, I.M.S., has been recommended to all Civil Surgeons; it is easily kept sharp and causes no bleeding.

The Sanitary Commissioner remarks that the subject of revaccination requires attention as the disastrous results of its neglect was shown in the epidemic of small-pox in Nagpur. He states that the immunity conferred by infant vaccination gradually ceases, and that at the age of 15 or so, it has ceased to exist, the chances of being then attacked by small-pox become practically equal to those of the unvaccinated.

On an estimated birth rate of 40 per thousand of the population, 69·18 per cent. of the infants were successfully vaccinated compared with 81·74 per cent. the year before. It is said that the rules in municipal towns are not rigidly enforced and it is suggested that the provisions of the Vaccination Act should be applied to all municipal towns and properly and rigidly enforced therein.

Glycerine calf lymph was used during the year. A scheme is under preparation for forming a central vaccine depôt, of the expediency of which there is little doubt. Until the scheme is an established fact, it is considered best that each district

should prepare its own lymph at head-quarters: very good lymph can be, and has been, for years obtained in this manner. The ratio of success for primary vaccination during the year was 96·56 per cent. against 96·01 per cent. the year before.

The cost of the department amounted to Rs. 72,643 as compared with Rs. 68,684 in 1910-11; the average cost of each successful case was one anna and nine pies or one pie less than in the previous year.

Madras.

87. The vaccination operations in the Presidency increased to 1,602,977 in 1911-12 from 1,546,184 in 1910-11. The primary operations increased to 1,455,485 from 1,368,173 in the preceding year, while the revaccinations decreased to 147,492 from 178,011. The percentage of success in the former class of work was 89·7, practically the same as in the previous year when the rate was 87·5, but in the latter the rate rose to 77·2 from 72·4 the year before. The largest increases were recorded in the districts of Malabar (25,085) and Trichinopoly (21,194), while the principal decreases occurred in Tinnevelly (13,164), Salem (10,959), North Arcot (8,481) and South Canara (7,312). The cause of the smaller outturn of work in the Tinnevelly district is attributed to the absence of co-operation on the part of the people and the transfer of two taluks to another district: in Salem to the prevalence of plague and absence of small-pox: in North Arcot to the absence of assistance from the village heads and reduction of the vaccinators' *minima*, and in South Canara to the non-entertainment of temporary vaccinators, absence of small-pox, short supply of lymph and defective registration.

On an estimated birth rate of 40 per thousand of the population 34·89 per cent. of the infants were successfully vaccinated against 35·34 per cent. the year before. In municipal towns 71 per cent. of the available infants under one year of age were successfully vaccinated.

Lanoline paste from the King Institute at Guindy was used in the vast majority of cases, the percentage of success in the Local Fund areas rising to 89·6 from 87·0 the year before, and in Municipalities to 93·2 from 92·0. Glycerine paste, also issued by the King Institute, was used in the Local Fund Ranges of North Coimbatore and Malapuram with a ratio of success of 69·7 per cent. and in the Corporation of Madras with a ratio of success of 97·6 per cent.

The cost of the department amounted during 1911-12 to Rs. 3,16,559 against Rs. 3,23,779 the year before, and the average cost of each successful case was three annas and nine pies against four annas and two pies.

Coorg.

88. The total number of operations performed in Coorg fell from 16,154 in 1910-11 to 13,369 in 1911-12; of these 8,425 were primary cases and 4,944 revaccinations, against 9,360 and 6,794, respectively, in the previous year. The percentage of success in cases the results of which were known was 94·83 in primary cases and 81·92 in revaccinations, against 93·79 and 72·69, respectively, in the previous year.

On an estimated birth rate of 40 per thousand of the population, 8·54 per cent. of the children available were protected compared with 9·00 in 1910-11. In municipal areas between October 1910 and September 1911, there were 174 births and 96 children under one year of age were vaccinated, 92 of them successfully.

The cost of the department amounted to Rs. 2,818 against Rs. 2,920 in the previous year; the average cost of each successful case was four annas as compared with three annas and seven pies in 1910-11.

Bombay.

89. The total number of vaccinations performed in the Bombay Presidency during the year was 692,413 primary and 68,707 revaccinations, as compared with 661,911 and 59,408, respectively, in the preceding year. There was an increase in primary vaccination in all the Registration Districts except the Central where there was a decrease of 2,296 attributed to the deficit of available children owing to the abnormal number vaccinated at the time of the severe epidemic of small-pox at Poona in 1910. There was a slight decrease in revaccination in the Western and Central Registration Districts. It is satisfactory to record the general increase in spite of the severe plague epidemic of 1911-12 and the decrease in population in some districts of the Presidency. The percentage of success in primary cases and revaccinations was

99·00 and 51·18 against 98·76 and 61·34, respectively, in the preceding year. The scheme for the control of vaccinators by local bodies was extended for a further period of one year, though it has not been an unqualified success.

On an estimated birth rate of 40 per thousand, 55·36 per cent. of the children available were protected compared with 56·56 in the preceding year. In towns the number of children vaccinated exceeded the number estimated as available; this is presumably accounted for by children being brought in from outside. It is remarked that the work of the department is far more efficiently carried on in towns where the Vaccination Act is in force.

The main buildings for the vaccine institute, Belgaum, are now complete with the exception of the Director's bungalow, but the work of putting in the refrigerating plant and engines has not yet been started, and the fittings of the inoculated calves stable have not been finished. During the year 673,812 doses of vaccine lymph were distributed as against 635,282 in the previous year. The results of the vaccine issued to vaccinators in the Presidency show case and insertion success rates of 99·21 and 95·70 respectively.

The following table shows the several descriptions of lymph used, the number of operations performed with each, and the results obtained.

Districts.	Kind of lymph used.	Number of operations.		Successful cases excluding "unknown."		Percentage of success excluding "unknown."	
		Primary.	Re-vaccination.	Primary.	Re-vaccination.	Primary.	Re-vaccination.
Western Registration District ...	Glycerinated ...	128,775	11,020	115,720	5,366	98·62	65·82
Presidency Circle	Animal	6,800	2,167	6,270	145	99·29	71·08
	Glycerinated ...	14,721	18,931	13,325	62	97·23	26·50
Central Registration District ...	Glycerinated ...	151,702	2,949	139,138	1,565	99·72	74·63
Southern Registration District ...	Human	17,343	733	17,328	584	99·93	80·44
	Animal	5,172	116	5,158	115	99·77	99·14
	Glycerinated ...	124,083	17,602	116,827	7,551	99·28	58·61
Gujrat Registration District ...	Human	31,308	2,028	30,700	212	98·98	10·47
	Glycerinated ...	99,031	3,821	91,743	1,534	99·04	53·25
Sind Registration District ...	Human	92,671	2,075	84,041	1,081	98·98	79·54
	Animal	4,813	873	4,700	464	99·87	78·91
	Glycerinated ...	1,264	27	1,219	9	99·11	60·00

The total cost of the department during the year amounted to Rs. 353,707 as against Rs. 356,870 in the previous year, and the average cost of each successful case fell from nine annas and three pies to eight annas and nine pies.

Burma.

90. There was again an increase in vaccination work in Burma during 1911-12 when the total operations numbered 517,392 against 413,026 in 1910-11. There were 422,521 primary and 94,871 revaccinations, showing increases of 66,740 and 37,626 in the two classes of work, compared with 355,781 and 57,245, respectively, in the preceding year. The results indicate a determined effort on the part of District Superintendents of Vaccination and Health Officers and their staffs, to improve on the work of previous years. In Rangoon, the number of successful revaccinations shows an increase of 15,188 operations, and in Prome 3,555: in both places the increase is attributed to vigorous efforts to suppress severe outbreaks of small-pox. The districts of Hanthawaddy, Prome (as regards primary operations), Myaungmya, Myitkyina, Lower Chindwin, and the Northern Shan States, did not share in the general increase. The percentage of success in primary cases was 96·61 against 95·50 the year before and in revaccinations 71·79 against 67·60.

At dispensaries there was a decrease of 8,216 operations. This however is apparent rather than real as the practice in previous years of including operations performed on prisoners in jails under this head has been discontinued.

On an estimated birth rate of 40 per thousand, 19·02 per cent of the children available were protected against 17·34 in the preceding year. In 47 municipal towns the number of children under one year of age available for vaccination was 18,071, but the number actually vaccinated was 18,956. The excess is generally attributed to an influx of visitors to the town bringing infants with them, but the provincial

Sanitary Commissioner considers it far more probable that, in the majority of instances, the excess is due to an error in the registration of births.

Allusion is made to the prosecution and conviction of three inoculators. The Sanitary Commissioner remarks that the penalty of one month's rigorous imprisonment in one case, and of a fine of Rs. 50 in each of the other two, is quite inadequate to put down inoculation which is undoubtedly the cause of much of the small-pox and responsible for many deaths. The extension of the Act for the prohibition of inoculation to all districts of Lower Burma has been recommended, and proposals have been made for reorganizing the vaccination establishment so as to secure greater attractions to vaccinators in the matter of pay and promotion.

Glycerine vaccine paste and lanoline paste were prepared at the Meiktila vaccine depôt. Lymph for 693,913 operations was issued, an excess of about 79,000 over the issue in 1909-10, the previous highest record. It is remarked that successive directors of the depôt have represented the necessity for an increase in the teaching staff, for more accommodation for teaching, and for the staff and for more stabling for calves. A cold storage on a small scale is to be installed at the depôt which will admit of the maintenance of a larger stock of lymph than formerly for use during the hot weather.

The total cost of the department during the year amounted to Rs. 2,00,604 against Rs. 1,93,279 in the previous year, and the average cost of each successful vaccination fell from nine annas and one pie to seven annas and five pies.

Ajmer-Merwara.

91. In Ajmer-Merwara the total vaccinations during 1911-12 numbered 15,486 primary and 1,034 revaccinations, compared with 13,100 and 306, respectively, in the preceding year. The percentage of success in the two classes was 98·17 and 81·81 against 97·49 and 90·10, respectively, in 1910-11.

On an estimated birth rate of 40 per thousand, 47·36 per cent. of the children under one year of age were protected compared with 51·20 in the previous year.

The total cost of the department during the year amounted to Rs. 3,098 against Rs. 3,115 in 1910-11, and the average cost of each successful vaccination fell from three annas eleven pies to three annas and two pies.

Vaccination among Troops.

92. Particulars of vaccination in the Army will be found in statement III of the annual report of the Sanitary Commissioner with the Government of India.

SECTION VI.

MEDICAL INSTITUTIONS.

(CONTRIBUTED BY THE DIRECTOR-GENERAL, INDIAN MEDICAL SERVICE.)

A.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private-aided).

India.

93. The State-Public, Local Fund and Private-aided hospitals and dispensaries in British India now number 2,707, an increase by 37 on the figure for 1910; and the demand for more is felt everywhere. The system of supplying treatment to the population in areas where no dispensaries yet exist, by means of an itinerating staff, has been extended in the United Provinces and Punjab, and has been attended with much success. The year was a much healthier one than 1910, especially as regards the prevalence of malaria, and the total number of cases treated was slightly lower in consequence; the number of out-patients however showed an increase.

Expenditure rose from £783,123 in 1910 to £863,168 in 1911,—an increase of 10 per cent; but Indian subscriptions remained practically stationary, amounting to only £47,252 or a little over 5 per cent. of the whole. The population generally shows little desire to share in the burden of providing the institutions, though it makes use of them in ever increasing numbers.

The following comparative statement shows in tabular form the main features of the operation of these hospitals and dispensaries during 1910 and 1911:—

Province.		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of patients.	Number of operations.
Eastern Bengal and Assam ...	1910	360	24,322	3,524,639	3,548,961	80,769
	1911	373	24,584	3,695,044	3,719,628	83,043
Central Provinces	1910	167	13,808	1,775,965	1,789,773	40,831
	1911	167	13,449	1,717,846	1,731,295	43,699
United Provinces	1910	382	69,736	4,474,100	4,543,836	190,871
	1911	379	65,954	4,234,550	4,300,504	199,704
Burma	1910	187	55,277	1,316,994	1,372,271	40,470
	1911	188	57,896	1,411,143	1,469,039	43,116
Bombay	1910	327	54,612	2,207,073	2,261,685	90,123
	1911	335	55,891	2,135,640	2,191,531	92,365
Madras	1910	506	77,633	6,007,735	6,085,368	215,994
	1911	514	80,829	5,878,225	5,959,054	225,335
Punjab	1910	300	75,202	4,222,251	4,297,453	220,094
	1911	302	74,884	4,022,865	4,097,749	233,637
Bengal (excluding Calcutta) ...	1910	351	43,269	3,074,176	3,117,445	139,906
	1911	360	45,791	3,224,508	3,270,299	146,950
Calcutta	1910	15	24,752	311,702	336,454	35,301
	1911	15	25,819	303,410	329,229	33,754
North-West Frontier Province ...	1910	50	11,357	760,274	771,631	30,716
	1911	49	11,352	750,323	761,675	32,892
Baluchistan	1910	25	3,933	214,560	218,493	4,824
	1911	25	4,222	221,622	225,844	4,565
Total ...	1910	2,670	453,901	27,889,469	28,343,370	1,089,899
	1911	2,707	460,671	27,595,176	28,055,847	1,139,060

94. Ten additional dispensaries are now working, and there was a considerable increase in the numbers treated.

Bengal (excluding Calcutta).

There was less malaria than in 1910, but large numbers of cases of the disease were treated by the 24 sub-assistant surgeons on special duty who travel about the malarious tracts, and distribute "treatments" of quinine. This measure is now becoming appreciated.

The total expenditure amounted to £75,579, an increase of £9,291 over last year's figure. Indian subscriptions amounted to £17,597, a marked improvement.

95. The opening of the new surgical block (Prince of Wales' Hospital) of the Medical College Hospital has provided much needed additional accommodation. The total number of beds available has risen from 1,724 to 1,824.

Calcutta.

More nurses are needed at the Eye and Campbell hospitals.

Expenditure was £80,073, and Indian subscriptions amounted to £2,919, a larger figure than that of last year.

The new (Rogers) treatment for cholera was most successful, the recoveries varying from 60·77 to 70·59 per cent.

96. The number of dispensaries was increased by thirteen. The total number of patients treated was nearly $3\frac{3}{4}$ millions, although it was a healthy year. The proportion of females to males treated is 21 per cent. in the case of Hindus and 16 per cent. among Musulmans.

Eastern Bengal and Assam.

The total expenditure was £62,371, as compared with £46,082 in 1910; the increase was due partly to more building operations and partly to improvement of equipment. Indian subscriptions amounted to £6,187,—a slight improvement.

97. The year was a healthy one and there was a slight decline in attendances.

Central Provinces.

The shortage of sub-assistant surgeons has been partly made up, but the full number required has not been obtained. Steps are in progress towards improvement of the accommodation for medical subordinates throughout the province.

The total expenditure was £33,840, of which £4,429 represented subscriptions from Indians.

98. There was a decline in the number of out-patients owing to the markedly lower prevalence of malaria.

North-West Frontier Province.

A new scale of pay has been adopted for sub-assistant surgeons, and the compounder service has been reorganised.

Expenditure amounted to £10,925, of which only £329 was covered by Indian subscriptions.

99. The year was a healthy one, and there was a decrease in all classes of patients. The institution of travelling dispensaries has been enormously successful, and more than accounted for the decrease in attendance elsewhere, as they dealt with over 300,000 patients not included in the official totals. These travelling dispensaries, 32 in number, are engaged in plague prophylaxis, in the treatment of malaria and of general diseases. The new "King George's Medical College" has commenced work.

United Provinces.

Short courses of instruction have been given to 498 midwives.

The total expenditure was £109,779, of which Indians contributed £9,529. Several of the larger hospitals have been greatly improved, notably those at Aligarh, Meerut, and Bareilly.

100. The year was particularly healthy, and the number of cases treated declined by nearly 200,000. There were over 200,000 fewer malaria cases than in 1910. There was however a rise in the number of female children treated.

Punjab.

The system of charging well-to-do persons for dispensary treatment has been in force and is said to have somewhat reduced their attendance, while not affecting the poor patients.

The total expenditure was £78,612 of which amount £2,138 was met by Indian subscriptions.

The extension of the Mayo hospital has been taken in hand.

Burma.

101. There has been a further marked increase in the number of persons treated, and the Burman female population is resorting more freely to hospitals than formerly.

The new Rangoon General Hospital has been opened, and is very well patronised. The staff of nurses has been largely increased.

The total expenditure was £97,068, and local subscriptions amounted to £1,416.

The prospects of civil assistant surgeons have been improved, and the pay of sub-assistant surgeons has been increased; but there is still difficulty in obtaining enough subordinates.

Madras.

102. There was a decrease in the number of out-patients. The number of cases attended by midwives continues to increase; and reached 31,093 during 1911.

The total expenditure was £169,524, of which amount Indians subscribed £1,651.

Bombay.

103. The figures for admissions and cases treated do not differ much from those of last year; the presence of a larger number of private unaided institutions in the Presidency undoubtedly results in lower attendance at State dispensaries than in other parts of India.

Expenditure amounted to £140,073, and Indian subscriptions to £1,036.

Baluchistan.

104. There was an increase in the numbers treated, although the year was a healthy one. The attendance of Musulman women continues to rise.

Expenditure amounted to £5,323, and Indian subscriptions to £20.

B.—*Civil Hospitals and Dispensaries.*—(*State-Special, Railway and Private non-aided*).

105. The number of these institutions has increased, as detailed in the following tables. As pointed out last year private dispensaries are far more common in India than elsewhere.

The following statements show in tabular form the main features of their activity during 1910 and 1911:—

State-Special and Railway Hospitals.

Province.		Institutions.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta)		113	13,443	307,219	320,662	10,282
Calcutta		2	3,164	2,549	5,713	372
Eastern Bengal and Assam		88	8,445	135,351	143,796	2,621
Central Provinces		67	3,273	131,683	134,956	2,027
United Provinces		126	19,434	274,107	293,541	6,542
Punjab		151	5,716	426,110	431,826	16,143
Burma		75	13,952	169,015	182,967	1,630
North-West Frontier Province ...		27	6,690	123,504	130,194	2,632
Madras...		98	9,677	199,820	209,497	4,179
Bombay		74	4,054	211,270	215,324	5,289
Baluchistan		8	1,499	49,470	50,969	1,123
Total	1911	829	89,347	2,030,098	2,119,445	52,840
	1910	811	93,920	2,070,048	2,163,968	38,694

Private, non-aided institutions.

Province.		Number.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta) ...		126	10,563	1,028,657	1,039,220	29,168
Calcutta		2	.....	4,730	4,730	181
Eastern Bengal and Assam		88	1,555	704,790	706,345	15,795
Central Provinces		54	2,112	306,222	308,334	4,516
United Provinces		46	5,503	324,398	329,901	8,010
Punjab		12	3,501	63,103	66,604	2,681
Burma		1	125	370	495	.....
North-West Frontier Province ...		6	2,199	118,217	120,416	9,004
Madras		43	8,277	269,581	277,858	13,297
Bombay		324	14,843	1,863,308	1,878,151	57,269
Baluchistan		4	118	29,240	29,358	719
Total	1911	706	48,796	4,712,616	4,761,412	140,640
	1910	672	33,415	4,553,848	4,587,263	218,231

C.—*Lunatic Asylums.*

106. The following table shows the strength of the asylum population in 1911 and the statistics of sickness and mortality.

On the whole there was more sickness than last year, but fewer deaths. The death rate in the United Provinces was high, while the Central Provinces and Bombay show a marked improvement in this respect. The average of daily sick was higher in the United Provinces and Punjab than elsewhere.

The total cost of the 22 asylums was about £82,868, of which sum £7,395 were contributed by paying patients. The latter are a negligible proportion of the whole, except in Burma and Bombay.

More asylum accommodation is needed everywhere—

Province.		Number of Asylums.	Admitted and re-admitted during 1911.	Total Asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Number of Criminal Lunatics.
				Males.	Females.	Total.					
Bengal		3	193	921	215	1,136	70	71	957·58	79·38	443
Eastern Bengal and Assam ...		2	161	576	103	679	54	56	533·32	27·78	348
United Provinces		3	308	1,107	360	1,467	106	118	1,185·25	133·05	244
Punjab		1	226	672	169	841	106	58	635·25	124·76	184
Burma		2	183	707	117	824	55	72	629·67	33·15	394
Central Provinces		1	94	286	67	353	39	15	269·94	18·83	93
Bombay		7	389	1,093	274	1,367	136	89	1,019·8	34·6	201
Madras		3	250	728	246	974	110	69	750·50	64·64	217
Total	1911 ...	22	1,804	6,090	1,551	7,641	676	548	5,981·31	516·19	2,124
	1910 ...	22	1,680	5,908	1,497	7,405	679	586	5,784·24	397·58	2,031

107. Overcrowding occurred everywhere, but the percentage of constantly sick fell from 8·94 to 8·29. The death rate was 7·41 per cent. Sixty per cent of the inmates are employed on various industries. The provision of increased accommodation is under consideration.

Bengal.

108. There was an improvement in general health and fewer deaths; a cholera epidemic in the Dacca asylum accounted for 14 deaths. Overcrowding continues, and a tubercle ward besides other structural improvements is required at Tezpur.

Eastern Bengal and Assam.

109. The deaths were more numerous than in 1910, especially at Benares where the rate rose from 7·23 to 13·5 per cent. The pay of the warder staff is insufficient and difficulty is experienced in obtaining men. Accommodation for European males is entirely lacking at Benares and is very bad at Agra. A piped water-supply is being introduced at Bareilly, and has been carried out at Agra.

United Provinces.

110. The average number of sick has again risen from 75·01 in 1909 and 93·86 in 1910 to 124·76, but the percentage death rate has fallen from 13·43 to 9·13. Bowel complaints and the vice of mud eating are said to be less prevalent.

Punjab.

Only 145 inmates were employed on manufactures, and most of these were criminal lunatics. The difficulty of obtaining asylum attendants is as great as ever. All patients suffering from tubercle are now segregated.

111. The mortality rate has declined markedly from 26·83 in 1910 to 5·56 per cent in 1911. Measures have been adopted to improve the asylum, and to increase the warder and sweeper staff, and special precautions against infection with intestinal worms.

Central Provinces.

It is considered that a whole-time alienist should be appointed to the charge of the institution.

112. The building of the new asylum at Yeravda is nearing completion, and it will then be possible to close at least two other asylums. The mortality has fallen from 130 in 1909 to 89; Naupada is still the worst of these Bombay institutions both as regards mortality and sickness. The number of the asylum population is increasing. The difficulty of obtaining and keeping warders is very acute.

Bombay.

113. A new female hospital and additional accommodation have been provided at Madras and a new female ward at Vizagapatam. Further improvements at Madras are contemplated. The health and mortality rate showed an improvement on those of 1910. There was no epidemic during the year.

Madras.

114. There is still overcrowding, and a new asylum is urgently needed. It is proposed to establish one at Insein. There has been a rise in sickness and in mortality, partly accounted for by dysentery. The water-supply is said to be above reproach, though, in the case of the Rangoon asylum, deficient in quantity in the summer.

Burma.

D.—*Medical Colleges and Schools.*

Colleges.—There are four colleges which afford the course for University degrees, and also train military assistant surgeons. During the year the students numbered 1,553 civil and private male, 93 female and 204 military students.

Schools.—There are fourteen schools which train civil military and private pupils for the passing out diploma. The students numbered 1,865 male, civil and private, 287 military and 135 females.

115. *Medical College, Calcutta.*—The fourth block of the college has been completed. The provision of biological and physical laboratories is still under consideration. There is urgent necessity for a hostel for students.

Bengal.

The number of applications for admission to the college continues to increase; from 293 in 1909 and 380 in 1910 it has risen to 531 in 1911. The number of students on the rolls was 656 male and 19 female, exclusive of the military pupils numbering 118, and 6 women of the "certificate" class. Seventy-five pupil nurses were under training, and 34 "dhais".

Eleven students went up for the final M. B. and 3 passed, and 82 for the final L.M.S. of whom 52 passed.

The total expenditure was £ 19,549, and receipts from fees amounted to £ 3,959.

Medical Schools.

Bengal.

Campbell School.—Improvements are being carried out in the buildings and equipment. The students number 318 male and 23 female, and of these 34 males and 2 females passed the final examination, and 48 males and 1 female passed as compounders.

Temple School, Patna.—A hostel for females is under construction, and further extensions are contemplated. There were 133 male and 3 female students; of these 9 males obtained the diploma and 37 qualified as compounders.

Orissa School, Cuttack.—There were 113 male and 6 female students; of these 14 males obtained the passing out diploma, and 21 became compounders.

Eastern Bengal and Assam.

116. *Medical School, Dacca and Dibrugarh.*—The total number of students was 307 males and 7 females. Of these 61 males passed the final examination for a diploma. There were 17 military students at Dacca and 14 at Dibrugarh, of whom 10 passed into the service. The compounder classes numbered 139, and 104 qualified.

United Provinces.

117. *Agra Medical School.*—The number of students was 326, of whom 72 were females, 65 belonged to the military and 14 to the compounder class—61 male students (including 9 military) passed the final examination; of females 12 obtained diplomas.

Punjab.

118. *Lahore Medical College and School.*—The separation of the college and school will be carried into effect as part of the Punjab King Edward Memorial scheme, and it is hoped the school may be removed elsewhere.

The number of students in the college was 156 (including 10 women) and 322 in the school. The latter number represents an increase which is due to the improved prospects of the sub-assistant surgeon class, civil and military.

Thirty-four students went up for the old L.M.S. and M. B. and 10 for the new M.B., and 26 and 10 respectively passed; three women went up for the "final certificate" and 2 passed; 50 students went up for the "final certificate" of the school and 36 passed.

The cost of the college has risen from £ 6,130 in 1906-07 to £ 7,525.

Burma.

119. *Medical School, Rangoon.*—The number of students on the rolls was 48, of whom 4 were women. None passed out during the year. The class of students who join leaves much to be desired from the educational point of view.

Madras.

120. *Medical College, Madras.*—The students numbered 423, of whom 35 were women. This number includes 51 military pupils, 40 sanitary inspector class and 12 sub-assistant surgeons undergoing postgraduate study. During the year 32 obtained the L.M.S. diploma, 11 the degrees of M.B., B.S., and 12 military pupils qualified. Of the successful L.M.S. candidates nine were women and one woman obtained the college diploma.

A scheme for the addition of necessary buildings to bring the college into line with teaching requirements is under consideration.

Medical School, Tanjore.—There are 82 male and 2 female students: 8 students passed the final examination.

Medical School, Vizagapatam.—There are 75 students—19 went up for and passed the final examination. More accommodation is required both in the school and hostel.

Medical School, Royapuram.—The school continues to grow, and more accommodation and a larger staff are required. There were 100 applicants for admission as private pupils, but only 24 could be taken; there are now 56 in the school. There are 14 female students. For the final examination 42 students went up and 32 passed; of these 4 were private, and the remainder Government pupils. The total number of students was 213.

121. *Grant Medical College.*—The total number of students was 531, of whom 29 were women and 35 belonged to the military class. Fifty-five students passed the final L.M.S. examination, of whom 4 were women; 3 obtained the degree of M.B.,B.S., 1 the M.D. and 2 the degree of Bachelor of Hygiene.

Bombay.

There is great need for new Bacteriological and Biological Laboratories.

Medical School, Hyderabad.—The school has 54 students, of whom 15 went up for and passed the final examination.

The staff has been increased by one teacher and three tutors.

B. J. Medical School, Poona.—The number of students was 124, of whom 35 were military. Seventeen obtained the passing out diploma. The staff has been strengthened by the addition of one assistant surgeon as teacher and three sub-assistant surgeons as tutors.

B. J. Medical School, Ahmedabad.—There were 131 students, of whom 52 were military and one was a woman. Seventeen students qualified. One teacher and three tutors were added to the staff.

The X-Ray Institute of India, Dehra Dun.

122. Two classes of instruction were held during the year. The number of students attending was 35. Of this number 33 passed the prescribed examination, 14 obtaining special proficiency certificates and 2 failed to pass. The students included officers of both services (Civil and Military), assistant surgeons and sub-assistant surgeons (Civil and Military) as well as one sub-assistant surgeon from a Native State.

The number of skiagraphic examinations made at the Institute was 1,140. The number of cases of disease sent for treatment during the year was 52.

The new workshops and store-rooms required in connection with the Civil Repair scheme are under construction and will probably be completed by the end of the current financial year.

A quantity of new apparatus employed in Electro-Therapy has been received by the Institute during the year, including apparatus employed in Ionic Medication.

No case of X-ray traumatism occurred to any of the staff, students or patients of the Institute.

SECTION VII.

SANITARY WORKS.

123. In the past, owing generally to funds being limited, progress in respect of sanitary works has necessarily been slow. Interest in sanitation has, however, been growing, and a distinct advance has now been possible in consequence of the large and special grants made to the provinces by the Government of India. In 1908, an annual recurring Imperial grant of 30 lakhs was made for expenditure on sanitary improvements with special reference to the prevention of plague. In 1910-11, a special non-recurring grant of 57 lakhs was made from Imperial revenues, of which five lakhs were intended for the promotion of research, and the balance for urban sanitary works in the various provinces. The latter was distributed as follows:—Madras (Rs. 4,25,000), Bombay (Rs. 4,25,000), Bengal (Rs. 10,00,000), United Provinces (Rs. 10,50,000), Punjab (Rs. 5,00,000), Burma (Rs. 4,00,000), Eastern Bengal and Assam (Rs. 4,00,000) and the Central Provinces (Rs. 2,00,000). A grant of 50 lakhs was given in addition towards the cost of work, being carried out by the Bombay Improvement Trust.

India.

In 1911-12, further special grants of 50 lakhs were made towards approved sanitary schemes in urban areas, and these were distributed—to Madras (Rs. 8,00,000), Bombay (Rs. 6,50,000), Bengal (Rs. 7,25,000), United Provinces (Rs. 8,00,000), Punjab (Rs. 6,17,000), Burma (Rs. 4,00,000), Bihar and Orissa (Rs. 4,62,000), the Central Provinces (Rs. 4,00,000) and Assam (Rs. 1,46,000). In addition to these allotments, Rs. 50,000 was given for the extension of rat-proof buildings in Fraser Town, Bangalore, as an experimental measure against plague. During the past two years a sum of about Rs. 4½ lakhs has also been distributed among minor administrations, and a subvention of 25 lakhs has been made towards the water works and drainage scheme of the city of Madras.

In all, during the last two years the Imperial Government's grants for sanitation have aggregated 181⅓ lakhs of rupees. This has undoubtedly admitted of a marked advance in sanitary reform and improvement.

It will not be out of place to mention here that *pari passu* with allotments for sanitary works the Imperial Government has provided a recurring grant of Rs. 2½ lakhs per annum to assist local Governments and Administrations to reorganise their sanitary services and to provide additional staff.

As regards malaria schemes, during the year 1912-13 the Government of India considered the question of financial assistance to important projects in certain provinces. The following grants have been sanctioned:—*Madras*—Rs. 28,000 for the malaria enquiry at Ennore. *Bombay*—Grants of Rs. 21,380 and Rs. 50,000, for (1) malaria investigation in Sind and the Kama District, and (2) anti-malarial measures in Bombay City, respectively. *Bengal*—Rs. 50,000 for experiments on jungle-clearing as a measure against malaria on a proposal made by the Scientific Advisory Board of the Indian Research Fund. *United Provinces*—Rs. 1,80,000 for certain anti-malarial schemes to be carried out in those provinces.

An account of the principal sanitary works in the several provinces during the year under report will be found in the following paragraphs.

124. During the year 1910-11, there was no change in the number of municipalities in Bengal, which numbered 130 excluding Calcutta. The total income, including the opening balance amounted to Rs. 87,66,333 compared with Rs. 80,82,914 in 1909-10. Of the total income 34·57 per cent was spent on sanitary works, original and recurring, against 40 per cent. the year before, 6·65 per cent. on roads against 6·96 per cent., 3·91 per cent. on public safety against 4·35 per cent., and 31·99 per cent. on all other requirements against 25·57 per cent. The total expenditure on sanitary works during the year was Rs. 36,13,992, showing a decrease of Rs. 1,83,020 compared with the

Bengal.

preceding year. The chief decreases were on water-supply (Rs. 1,42,158) and drainage (Rs. 87,548) and were due to the expenditure in the previous year having been abnormally large in consequence of the construction of drains in various towns. A sum of Rs. 43,766 was spent on markets and slaughter-houses, the increase of Rs. 13,301 compared with 1909-10, being accounted for by the construction of new buildings in six towns. The increase of Rs. 231 on conservancy was insignificant, but it is noted that the conservancy work in municipalities was generally efficiently performed.

The expenditure on sanitary works executed by Government, Municipalities, District Boards and private individuals amounted to Rs. 10,90,363 compared with Rs. 11,88,448 the year before. The more important of these works were—construction of drains in Howrah (Rs. 50,614), Bhatpara (Rs. 71,885), Arrah (Rs. 51,765), construction of water works at Monghyr (Rs. 80,525), works in connection with the Darjeeling sewage scheme and ropeway (Rs. 97,093), construction of bazar buildings and quarters for the Superintendent of conservancy and Assistant Electrician at Darjeeling (Rs. 63,322).

A steady improvement is recorded in the working of the septic tank installations. A new type of distributor has been designed which has largely solved the question of distribution over the filter beds. It is claimed that the septic tank latrine installations are now practically perfect in design. The chlorinating of all the effluent is now extremely well done and it is seldom that a mill effluent is found that is not practically sterile.

In the provincial report is a statement showing the distribution of grants during 1911-12 out of the Rs. 9,50,000 provided for sanitary improvements. The more noticeable of the grants were those made for (1) Howrah water-supply (Rs. 2,50,000), (2) the animal vaccine depôt at Entally (Rs. 1,11,335), (3) dredging of the Nawai and Santhi rivers (Rs. 1,00,000), while the Gaya drainage, and the Monghyr and Hooghly-Chinsurah water works each received Rs. 50,000.

125. There were seven meetings of the Board during the year, but as usual, the bulk of the work was done by the circulation of files among the members.

Sanitary Board.

Contracts have been let and work is in progress on nine water-supply and eleven drainage schemes, the total value of the current contracts amounting to about 20 lakhs of rupees. The rate of progress on the works is reported to have been disappointing, the delays being ascribed to causes, such as constructional difficulties, lack of energy on the part of contractors, changes found necessary in designs, non-delivery of materials and delays in the acquisition of land. It is, however, anticipated that in the next few years the rate of progress will be considerably accelerated.

The report of the Sanitary Board gives brief particulars of seven new schemes of water-supply taken up during the year, of twelve under construction, and mentions that the survey for the Jherriah coal-fields scheme was completed, the Sanitary Engineer drawing up alternative gravitation and pumping schemes. The estimated cost of this scheme is, for the gravitation supply, Rs. 37,50,000 and for the pumping supply, Rs. 28,60,000. The quality of water supplied during the year was on the whole good, but at Howrah, Burdwan, Arrah, Berhampur and Bhagalpur the quality on one or two occasions was found to have deteriorated. At Darjeeling the analysis of the water-supply did not show signs of serious pollution, but the water-supply at Kurseong is not considered to be satisfactory at present. During the year there were eleven drainage schemes in course of preparation and others were being examined or revised. Brief particulars are furnished in the report of the progress made with sixteen drainage schemes under construction. A proposal to appoint a special Public Works Department Drainage Division to investigate and prepare drainage schemes for malarial tracts was referred to the Board by the local Government for opinion. In this connection the local Government remarks that a common and oft-repeated cry in Bengal is that the cause of malaria is largely due to defective drainage, and that what is required is a systematic investigation by an expert establishment to submit definite and authoritative reports regarding localities where the drainage is defective. Such information is to be collected by a special officer appointed for the purpose, who will first investigate the conditions near the Bhairab river in Jessore.

126. During the year 1911, there were, as in the previous year, 46 municipalities, one station and four unions. Their total income amounted to Rs. 20,84,643, and was

Eastern Bengal and Assam.

Rs. 6,848 in excess of the income in 1910. The expenditure on sanitation and sanitary works, excluding that on roads, was Rs. 10,47,331 compared with Rs. 11,20,194 during 1910, representing 50·24 and 53·91 per cent. of income respectively. The smaller expenditure during the year under report is accounted for by a decrease of Rs. 1,79,769 on water-supply, due to smaller expenditure by the Dacca municipality. There was increased expenditure under most of the other heads, the largest being Rs. 73,559 under "Conservancy", largely due to the expenditure on the conservancy tramway at Dacca.

Among the principal sanitary works, may be mentioned the sewerage scheme for the city of Dacca, estimated to cost Rs. 23,00,000; detailed plans and estimates are being prepared. In addition, a scheme for a municipal market, estimated to cost Rs. 1,75,000, has been under consideration. The reduplication of the pumping plant of the water works at Narayanganj has been completed, and the scheme for the extension of the water-supply to the portion of the town on the opposite river bank is taking definite form. Filtered water is now supplied to the town of Munshiganj; the remodelling of the Mymensingh water works, at a cost of over half a lakh of rupees, is practically complete, and the water works at Barisal are also practically complete. The question of a cheap and efficient method of treating the water of the artesian borings at Chittagong has not yet been decided, and the attempts to discover a suitable source of water-supply for Rampur Boalia have not so far been successful. For Shillong a surface drainage and sewerage scheme, somewhat on the lines of that at Ootacamund, has been drawn up, and the improvement and extension of the water-supply has been undertaken at a cost of Rs. 81,290. Proposals for the improvement of the conservancy of Shillong are also being framed.

Village sanitation in the province is confined to the improvement of the water-supply.

127. The report of the Sanitary Board has not been received.

Sanitary Board.

United Provinces.

128. During the year 1910-11, the total income of municipalities amounted to Rs. 73,23,645 out of which Rs. 28,81,297 was spent on conservancy, water-supply and drainage: the proportion of expenditure on sanitation to income was 39 per cent. compared with about 41 per cent. in the previous year.

The year 1911 was one of very considerable sanitary progress. The water works, with the exception of those at Allahabad, generally gave good results, and there was good progress on drainage and other forms of town improvement in the larger municipalities. The large schemes finally sanctioned during the year include the Allahabad drainage scheme to cost Rs. 15,71,866, the Cawnpore water-supply, Rs. 6,67,190, the Rikhikesh drainage, Rs. 1,01,571, new engine, Gaughat, Lucknow, Rs. 1,00,079, Ghat sewer, Benares, Rs. 89,239, new balancing tank, Lucknow, Rs. 69,850, new Orderly Bazar sewer, Benares, Rs. 68,912, and improving the Ghaziuddin Hyder canal, Lucknow, Rs. 57,262. Projects prepared, but not finally sanctioned, include the Landaur Bazar improvement, Rs. 2,22,564, and drainage schemes at Ballia (Rs. 1,99,156), Fatehpur (Rs. 1,55,916), Tilhar (Rs. 1,11,728) and Shahganj (Rs. 69,848), while schemes were under investigation for drainage at Muttra and Brindaban, and water-supply at Muttra, Allahabad (extension) and Naini Tal (improvement). During the year the drainage works at Moradabad were completed: the estimated cost was Rs. 4,81,458, but a grant of Rs. 50,000 was required to balance the accounts. On the other hand the drainage works at Firozabad were completed with a small saving on the estimate, the surplus being utilized on street paving. The drainage works at Farrukhabad and Hathras were also completed, as also the intercepting sewer works and the Husainganj and Ghasirimandi drainage, a sum of Rs. 2,92,832 having been spent on these during 1911. At Lucknow new sanitary roads were constructed to open out congested areas, a sum of Rs. 2,30,707 being spent for this purpose.

The provincial Sanitary Commissioner remarks that it is yearly becoming apparent that, in the larger towns at least, interest in sanitation is growing and that the improved health and greater comfort derivable therefrom is more and more recognized by the people generally. The Sanitary Engineer also notes that not many years ago sanitary proposals for drainage and water-supply schemes were often looked on with suspicion or indifference, but judging from the number of schemes now asked for it would appear the people are beginning to regard such works as necessities.

Sanitary Board.

129. During 1911, the Sanitary Board held nine meetings. The appointment of a Secretary to the Board having been sanctioned, effect was given thereto from 1st April

1911. The Board considered the distribution of the grant of five lakhs placed at its disposal by Government and made certain allotments, the principal of which were Rs. 1,00,000 to the Allahabad drainage scheme, Rs. 50,000 for rural sanitation, Rs. 46,700 for the Firozabad drainage works, Rs. 40,000 for the Mirzapur water works, and Rs. 38,000 for the balancing tank, Lucknow water works. In addition to the provincial grant of five lakhs, an Imperial grant of 10½ lakhs was sanctioned which was distributed between ten schemes; of these sanction was accorded to some, *viz.*, Allahabad drainage Rs. 2,00,000, Lucknow water works Rs. 1,07,000, Benares intercepting sewer and drainage of mohallas, Rs. 1,03,236, Hapur drainage, Rs. 1,00,000 sanitary works at Naini Tal, Rs. 59,060, Almora drainage, Rs. 28,000, acquisition of land for model houses, Lucknow, Rs. 23,000 and Landour Bazar drainage scheme, Rs. 2,000. Projects of the estimated value of Rs. 34,43,059 were either approved or recommended for sanction during the year. In addition, projects for several works were returned for further particulars or for revision in accordance with advice given. Among other matters considered by the Board was a programme drawn up by the Sanitary Engineer of sanitary works to be undertaken, and works for which projects should be prepared, and approval thereto was accorded.

Punjab.

130. Particulars of the income of and expenditure by municipal and district bodies are not contained in the provincial sanitary report. From the report of the Sanitary Engineer it appears that this officer was employed in addition to his own duties, on the Coronation Durbar water supply works, including municipal extensions for Durbar purposes, the estimated cost of which was Rs. 12,26,000. Many other miscellaneous works connected with the Durbar were also carried out by the Sanitary Engineer. Particulars of the more important provincial works carried out during the year are as follows.

Simla.—The surface drainage is now fairly complete. The extension of the sewage mains, estimated to cost Rs. 61,000 has been commenced, and the water works extension, the estimated cost of which exceeds four lakhs, is in progress. The work on the incinerator was completed at a cost of Rs. 11,461.

Delhi.—The suburban drainage works, estimated to cost Rs. 3,14,018 are making progress, and the work of clearing the Bela ground, for which a grant of Rs. 44,926 was made by Government, was in hand.

Amritsar.—The sewage disposal works, the estimated cost of which is Rs. 1,08,828 have been practically completed, the duplication of the pumping plant and the erection of detritus elevating machinery, remain. An estimate is under preparation for sinking perforated tubes in the wells at the water supply head-works as the tests made resulted in a considerable increase in the yield. Proposals for the sewage works for the Dhab Khatik area, which will probably cost over two lakhs, are being worked out.

Lahore.—To meet the increasing demand for water, work has been commenced on the sinking of eleven new wells for the water supply head works, which will, it is estimated, cost Rs. 75,000. A preliminary rough estimate for 15 lakhs for a water-borne sewage system has been prepared and forwarded to the Sanitary Board for approval and to obtain administrative sanction.

Sialkot.—A rough estimate for Rs. 4,27,000 for a water supply scheme was prepared and submitted for sanction.

During the year eight important sanitary works were completed, the aggregate cost of which was Rs. 3,44,000, and seven estimates of the total value of Rs. 1,86,700 were sanctioned. The Sanitary Engineer scrutinized and approved 19 estimates, the aggregate cost amounting to Rs. 4,17,000, in addition to that of the Sialkot water supply scheme referred to above.

Sanitary Board.

131. There was no change in the constitution of the Board, which held four meetings during the year. The Board made grants for sanitary works from the grant placed at their disposal, considered schemes, and after approval forwarded them to the local Government for sanction. The Board also considered and offered their views on certain changes proposed in the Western Jumna canal, from the point of view of their effect on the public health.

132. Although no important sanitary scheme was begun or completed in the province, considerable improvements were effected in the more important towns. The special Imperial grant of Rs. 1,13,000, for sanitation allotted to the province was distributed among the five districts. In Peshawar city the municipality, apart from the share of the Imperial grant, spent Rs. 94,114 on sanitary charges; this body spent Rs. 18,000 on water supply, Rs. 35,000 on paving and Rs. 20,000 on drainage. A much needed improvement in the disposal of night-soil and filth is to be effected. In Dera Ismail Khan the Government grant of Rs. 14,000 was spent in paving the city and providing *pucca* drains. The municipality expended, apart from the special grant, Rs. 34,055 on sanitary charges, and as the incineration system was not popular, it was arranged to remove the night-soil by a good and special road to a trenching ground which is well managed. At Abbottabad and Kohat Rs. 24,010 and Rs. 21,815, respectively, were spent on sanitary charges. An increased pipe water supply in the latter town is said to be required in order to admit of the closing of the numerous wells within the city walls.

North-West Frontier Province.

133. The provincial sanitary report does not contain information of the income and expenditure of municipalities and the amounts spent on sanitary works. The Gorewara tank water supply was completed at a total cost of Rs. 9,80,000, of which Rs. 5,03,567 was spent during the year. The Harda water works were also completed at a cost of Rs. 1,16,151. Improvements were effected to the water works at Burhanpur, Seoni and Amraoti civil station, and projects are being drawn up for further improving the water supply arrangements both in the city and civil station of Amraoti, while the contemplated improvements to the Hinganghat water works have been taken in hand. A project for increasing the present water supply of Akola town is nearly ready, and schemes for providing water at Saugor, Damoh, Chanda and Arvi, and improving the arrangements at Wardha, are being prepared.

Central Provinces.

Drainage works were in progress only in Nagpur, the project being estimated to cost Rs. 35,51,250 of which only a part costing Rs. 16,00,000 is to be effected at present. Work is soon to be undertaken on the Wardha surface drainage scheme, estimated to cost Rs. 2,04,505, of which the Government grant-in-aid will be Rs, 1,00,000. In Akola and Khamgaon surface drainage schemes have been drawn up and work will be undertaken on settlement of the question of finance. Projects are under preparation for a sewerage scheme for Jubbulpore, and surface drainage schemes for seven other towns.

In municipal towns a considerable degree of improvement was effected, but it is said much remains to be done. Although poor, as most of the municipalities are, the provincial Sanitary Commissioner remarks that this is not the cause of sanitation being gravely defective, it is because responsible persons do not personally interest themselves, and municipal members have not sufficient responsibility.

During the year tentative rules and regulations were drawn up for the employment of Sanitary Inspectors in towns, who, it is held, will do the greatest ultimate good as municipal employés. Candidates are at present to be trained at Bombay and nine men are now undergoing the course.

134. Proposals for the constitution and powers of a Sanitary Board for the province were drawn up during the year and await the sanction of the local administration.

Sanitary Board.

135. The number of municipalities in the Presidency was the same as in the preceding year. The provincial sanitary report mentions that the expenditure on sanitation for the nine months of the year, 1911, amounted to Rs. 14,68,751 against Rs. 13,05,355 in 1910, or 62·3 per cent of the total assignment. Of the expenditure; Rs. 6,71,448 was spent on conservancy, and Rs. 3,05,477 on water supply.

Madras.

There are now 19 towns with a piped water supply, Salem having been added to the list during the year, but owing to drought the supply here failed very shortly after the works were opened. Schemes for water supply and drainage are maturing in several municipal towns. Progress has been slow, but it is urged that with one Sanitary Engineer more could not be accomplished. The present position is that three water

supply and two drainage schemes await sanction; one joint water supply scheme and nine water supply improvement schemes, with eleven drainage schemes (one of them for improvement) have been investigated; six water supply schemes (one for improvement) and four drainage schemes are in course of investigation and twelve water supply schemes, (two for improvement) and ten drainage schemes have been proposed, but await investigation. The provincial Sanitary Commissioner states that it is much to be regretted that Municipal Councils have not availed themselves more largely of the liberality of Government in the matter of sanitary works falling within the scope of the recurring sanitation grant. There was no progress in the matter of sewerage, and Ootacamund is the only District Municipality which has been provided with a sewerage system. The works of this scheme are still in the hands of the Public Works Department, though the complete blocks were handed over to the municipality during the year.

As regards District Boards only 42·6 per cent. of the assignment for sanitation was spent during the nine months of the year. In respect of all heads—water-supply, drainage, conservancy—sanitation in rural areas is said still to be in a most primitive condition, evidence being afforded by the fact that in only one per cent. of 43,994 towns and villages is anything like conservancy attempted, and not a single town or village of any size has been provided with either a protected water supply or drainage scheme. The chief obstacle is the want of funds.

Sanitary Board.

136. There was no change during the year in the constitution of the Sanitary Board and its functions were as heretofore confined to advising on questions of sanitation and sanitary schemes. The Board examined and approved 70 sanitary schemes, the aggregate estimated cost of which amounted to Rs. 9,96,734; of these 30, estimated cost Rs. 7,42,782, were for municipalities, and the same number, estimated cost Rs. 1,80,327, were for local fund boards; nine, estimated cost Rs. 43,625, as famine relief works; and one, estimated cost Rs. 30,000, for the installation of experimental filters in the King Institute at Guindy, for the benefit of water supply systems in general. Of 46 schemes finally approved by the Board without submission to Government, seven were carried out, 25 were under execution during the year, one was transferred to the Public Works Department and the execution of 13 was deferred owing to various causes. During the year the Board issued five standard designs, and the revision of hospital type designs, commenced in 1910, was approaching completion at the close of 1911.

Bombay.

137. During the year 1910-11 there were 23 city municipalities and 134 town municipalities in the mofussil, making a total of 157, which is the same number as in the preceding year. The total income of these bodies amounted to Rs. 97,16,431 or Rs. 5,13,607 more than in 1909-10, while the expenditure on public health improvement was Rs. 25,78,603 against Rs. 25,18,218. Under the stimulus of liberal Government grants, closer attention was paid to sanitation, many improvements on water supply and drainage being carried out: the increased expenditure on public health was Rs. 2,83,000. During the year the provincial Government sanctioned certain allotments from provincial funds as well as from the Imperial grant of 7 lakhs. The provincial grants were exclusively for improvements to village water supplies, and those from the Imperial grant were mainly devoted to the improvement of water supplies, village sanitation, the proper equipment and maintenance of dispensaries and the upkeep of roads and bridges. In the Presidency there were 27 water supply and drainage projects either in progress or under investigation. Of the projects sanctioned during the year the chief one was for improvements to the Hyderabad (Sind) water works at an estimated cost of Rs. 3,19,255. Of the works in progress, Rs. 1,51,053 was spent during the year on the Bijapur water works; Rs. 1,54,342 on the Nasik water supply and Rs. 1,50,576 on the Poona City water supply. The Pundharpur water supply works were practically completed, and of the total expenditure of Rs. 4,03,235 so far incurred, Rs. 33,959 was spent during 1910-11. For the Ahmedabad water works a loan of Rs. 3,50,000 has been raised for extension and improvement, while for the Karachi water works the municipality raised a loan of Rs. 6,79,500, and arranged to construct a third covered reservoir and

a second large conduit from the river bed to the junction tank and to lay down new distribution pipes. On these two schemes Rs. 7,187 and Rs. 1,13,510, respectively, were spent during the year. Of the drainage schemes, that of Poona city was vigorously taken in hand and Rs. 2,83,787 spent. At Karachi the extension of the Shone system of sewerage to the Muchi Meani quarter was continued during the year, the expenditure amounting to Rs. 48,544. At Ahmedabad the engines of the drainage pumping station were repaired, new accessories purchased and new pipes added to the sewerage system, the total expenditure on original works amounting to Rs. 33,350. An alternative scheme to cost Rs. 7,46,000 for the water-supply of Ahmednagar by gravitation was prepared and is before Government for consideration. The investigation of the deep well supply of water in Guzarat promises interesting results. A sum of Rs. 3,780 was spent on boring plant during the year. An experimental sewage installation was established at Poona under Major F. H. G. Hutchinson, I. M. S., Rs. 7,661 being spent on the work during the year.

District Boards and Taluka Local Boards.—Of these there were 25 and 213 respectively during the year, the aggregate income of which during 1910-11 was Rs. 68,32,040. Of the income Rs. 3,52,902 was spent on water supplies and drainage, and Rs. 24,640 on other works of improvement.

During the year complete sanitary surveys on a uniform plan were made of 52 towns and villages which had been inspected by the Deputy Sanitary Commissioners, and there is now on record a considerable amount of valuable information shewing the chief sanitary defects therein.

Sanitary Board.

138. The Board held five meetings during the year. At them, among other matters, schemes for the improvement of the water supplies of Hyderabad (Sind) and Dhulia, and for providing water-supplies for Lonavla, Igatpuri, Barsi, Malegaon and Karad were dealt with. Applications from several municipalities for advice and practical help were received by the Board.

Burma.

139. The total expenditure on civil sanitary works in Burma during the year 1910-11 was Rs. 39,42,715, to which it fell from Rs. 45,64,279 in the previous year. Of this sum—the figures in brackets refer to the year 1909-10—Rs. 11,50,997 (12,60,177) was spent on water supply, Rs. 5,53,659 (Rs. 5,44,549) on drainage, Rs. 13,48,233 (Rs. 13,15,449) on conservancy, and Rs. 8,89,826 (Rs. 14,44,104) on other sanitary works. Municipal Committees spent 38·83 of their income on sanitary works, Town Committees 25·85 per cent., and District Cess Funds only 4·19 per cent.

During the year 1911, the Sanitary Engineer completed projects for six water supply-schemes, the principal of which were those for Bassein, estimated cost Rs. 2,34,161, and Pynimana, estimated cost Rs. 1,18,189. The water supply scheme for Pegu, estimated to cost Rs. 3,16,833 was returned for revision and further investigation is in progress, and that of Mandalay, to cost Rs. 12,94,804, is held in abeyance pending the testing of the foundation of the site of the dam. Projects were prepared for five drainage schemes and for three bazars.

Sanitary Board.

140. No meeting was held during the year. The constitution and functions of the Board are under revision by the local Government.

Military Works.

141. The expenditure during the year 1911-12 on ordinary Military Works was Rs. 87,04,100 against Rs. 89,27,929 during the year 1910-11, and on special military works Rs. 33,76,641 against Rs. 30,32,060.

Particulars regarding new works and improvements in some of the more unhealthy cantonments will be found in Tables IV *and XVI*.

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* Standard Tables of the Sanitary Commissioner's Annual Report.

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SECTION VIII.

GENERAL REMARKS.

142. During the year under review the staff of the *Central Research Institute, Kasauli*, conducted enquiries in connection with dysentery, malaria, including an investigation into the disease in the Andamans, and kala azar in Eastern Bengal and Assam. Reports of the enquiries have been published as numbers of the Scientific Memoirs by officers of the Medical and Sanitary Departments of the Government of India. Six classes of instruction in clinical bacteriology and technique were held at the Institute during the year, which were attended by 20 officers of the Indian Medical Service, five Military Assistant Surgeons, one Sub-Assistant Surgeon and one Lady Doctor. The course of instruction comprised the practical application of bacteriological methods to general practice, methods of improvising laboratories for this purpose, etc. The syllabus of the course was enlarged. It has been arranged in future for these classes to assemble in May, June, July and August each year and to admit to them 24 medical officers and 8 subordinates. A class of instruction in malaria was held at Amritsar, extending from the 15th March to the 28th April 1911, and was attended by 18 medical officers and subordinates from the several provinces. Future classes will be open to 32 medical officers and subordinates, half the number being drawn from the civil department and half from the military. Subsequent classes are referred to later.

Laboratories.

The demand for curative sera and vaccines continued to expand, and it was not possible to cope with the full requirements. The Serum and Vaccine Therapy Section of the Institute has now been established, and will help to develop this part of the work. The following statement shows the descriptions and quantities of anti-sera and vaccines issued during the past six years, and is an indication of the development that has been achieved.

Comparative statement showing the issues of Anti-sera and Vaccines.

Name.	Unit.	1906.	1907.	1908.	1909.	1910.	1911.
Antivenomous serum	c.c.	50,280	19,760	22,400	35,280	56,720	30,600
„ diphtheritic serum ...	c.c.	17,000	9,650	11,250	11,910	14,830	9,480
„ tetanic „ ...	c.c.	6,030	5,650	8,360	11,040	10,540	13,500
„ streptococcus „ ...	c.c.	...	4,760	8,360	1,350	4,470	5,700
„ dysenteric „ ...	c.c.	...	...	...	...	960	2,040
Normal horse serum	c.c.	...	...	...	...	600	1,900
High titre „	c.c.	...	...	...	...	17	60
Typhoid vaccine	c.c.	50	390	289	1,154	2,533	14,288
Tubercle „	c.c.	...	...	...	479	1,005	1,334
Staphylococcus vaccine	c.c.	...	...	...	203	375	425
Acne vaccine	c.c.	...	...	...	...	...	106
Special autogenous vaccine ...	c.c.	...	...	...	...	...	26475
Gonococcus „	c.c.	...	...	...	...	...	200
Solutions A and B for Von Pirquet's test.	tubes	...	...	...	...	447	1,041

Of these, anti-tetanic and anti-streptococcus sera are imported from England, the others being prepared at the Institute.

In addition, 1,000 pathological specimens were examined, including 30 tumours, the diagnosis being in each case communicated to the sender. In 35 cases special vaccines were prepared for patients. Scientific apparatus and chemicals were supplied in limited quantities in compliance with indents, the realizations amounting to Rs. 3,375.

As in previous years the *Bombay Bacteriological Laboratory* was conducted as (*a*) the Plague Laboratory for all India, and (*b*) as the provincial Bacteriological Laboratory. During the year 1911, the output of anti-plague vaccine constituted a record, as no less than 1,211,170 doses were issued, compared with 625,690 doses in 1910, 593,161 in 1909, and 533,315 in 1908. The large increase in the demand tried the resources of the Laboratory to their utmost, but it is satisfactory to note that all demands were met. No untoward result was recorded, but from some quarters complaints were received of the severity of the reaction after inoculation. A very searching enquiry was instituted into these complaints, the effects of individual brews being examined in relation to the length of time the brew had been incubated and to the period between sterilization and actual use. The brews about which complaints had been made were almost all fresh ones. As a result of experiments it was decided to despatch from the Laboratory vaccine which had not been brewed for a longer period than eight weeks. Further experiments suggested the issue, as far as possible, of "mature" vaccine only, but the unprecedented demand in the latter half of the year necessitated the issue of fresh vaccine. In order however to avoid unpleasant symptoms in the use of the fresh vaccine, it was advised to reduce the dose from 4 to 3 c.c. if used within three months of the date marked on the bottle. Although the larger dose probably produces greater immunity, the size of the dose must be limited by the severity of the reaction following inoculation, in order to prevent unpopularity of the measure. The large increase in the demand for anti-plague vaccine is abundant testimony of the growing confidence in this method of combating plague. Issues were made to all provinces, and Native States in India indented largely: 99,085 doses were supplied to countries out of India.

As usual the report of the Laboratory contains a selection of statistics of inoculation in several parts of India and also in China. In calling for the statistics the Director of the Laboratory drew attention to certain fallacies in connection with such statistics. Briefly they are (1) overestimation of the uninoculated population, especially in cases where many persons leave plague infected areas from fear of the disease, (2) overestimation of the inoculated when monetary rewards are offered, as poor persons frequently present themselves for inoculation more than once in a few months, (3) the number of attacks and deaths among the uninoculated is often recorded from the date when plague first appeared and comparison is made with attacks and deaths among the inoculated after inoculation has begun.

The research work conducted during the year included—

(*a*) The question of the severity of the reactions after inoculation with fresh plague vaccine.

The conclusion arrived at was that the best results in an inoculation campaign will be obtained with vaccines brewed for periods of about two months, but matured by storage for some months, but not longer than eighteen months. In this connection it is noted that work carried out for the Advisory Committee for Plague Investigation in India by Dr. Rowland,* goes to show that the immunising property of anti-plague vaccine is probably distinct from its toxic property. Dr. Rowland's work leads to the hope that it may be possible to separate the toxic element from the immunising element. If this can be done on a large scale in the manufacture of the vaccine, the prospect of carrying an inoculation campaign to a successful issue in India will be greatly enhanced.

(*b*) The questions whether people immediately after inoculation run a greater risk of acquiring plague infection than if not inoculated, and whether an inoculated person may continue to live in plague-infected surroundings without increasing the risk of infection while suffering from fever, and other symptoms attending inoculation, were investigated.

Experiments showed that the production of immunity commences immediately after inoculation. The practical point is that the experiments confirm the evidence

* Journal of Hygiene.—Plague Supplement, 1912, pages 20 to 46.

obtained by Colonel Bannerman, I.M.S. in 1901 that the anti-plague vaccine can be safely administered to persons living in plague-infected houses.

The Laboratory continued to be the head-quarters for the Plague Research Commission. The work carried out will be detailed in the reports of the Advisory Committee published as special numbers of the Journal of Hygiene. It is of interest to note here a few points of the work accomplished. After many failures the Laboratory succeeded in breeding wild rats (*mus rattus*, the common house rat of India) in captivity in specially constructed godowns. The conclusion of observations was that rats multiply very rapidly, and the important deduction can be drawn that destructive measures if they are to be effective must be very thoroughly and very persistently carried out. Further observations and experiments showed that in the course of a series of epidemics of plague, there is evolved a race of rats naturally immune to plague. This discovery is said to give the assurance that in process of time, it may be many years, plague will disappear from India.

The Health Department of Bombay City continued to send to the Laboratory rats found dead or caught alive within the municipal area. During the year a total of 582,345 rats were sent: of these 134,401 were subjected to *post mortem* examination and 11,573 found to be plague infected. As usual a considerable number of medical men were given instruction in the examination of rats and the diagnosis of plague in them. Many were also shown the method of manufacture of anti-plague vaccine and others instructed in the technique of inoculation.

The pathological work done for the province was greater than in former years and included examinations of blood sera (721 specimens), blood smears (429), sputa (104), pus (67), urine and fæces (85), swabs of throat discharges (10), body fluids (24), slide smears of glands (26); pneumococci were isolated in two cases by blood culture, one sample of water was examined and one worm, three mosquitos, 19 snakes and 13 scorpions were identified. In addition the examination of the brains of dogs and other animals for the diagnosis of rabies was performed in 83 cases, and the pathological tissues received for diagnosis numbered 357 compared with 263 in the preceding year. During the year 44 snakes were received for the extraction of venom against 105 in 1910.

Research work in connection with diseases other than plague was confined to three subjects, *viz.*, Guineaworm disease (Dracontiasis); the treatment of syphilis with "606"; and the treatment of leprosy with a vaccine prepared from a streptothrix isolated by Captain T.S.B. Williams, I.M.S.

The assistance and advice rendered by the Laboratory included visits by the Director and his assistants to certain hospitals in Bombay, to assist in arriving at a diagnosis in obscure cases of disease and to treat other cases with salvarsan tuberculin, and other vaccines. The Laboratory supplied bacteriological equipment and material to medical officers in all parts of India, and stored for sale, to medical officers, therapeutic sera from the Lister Institute, London.

The realizations from sale of materials from the Laboratory during the year amounted to Rs. 80,506-10-1 against Rs. 45,059-2-11 in 1910.

One class for Sub-Assistant Surgeons was held during the year. Several medical men attended the routine practice of the Laboratory, and arrangements were made to give a series of popular lectures to High School teachers.

The King Institute of Preventive Medicine at Guindy, Madras, consists of two sections—the Vaccine Section and the Microbiological Section. The work of the former is referred to in Section V of this report. In the latter a great deal of work was carried out during the year 1911, and owing to the increasing demand for therapeutic vaccines, the staff was strengthened by the appointment of Assistant Surgeon Kesava Pai, M.D., who will devote his whole time to this branch of the work. The systematic examination of the water supplies of the Presidency was continued, the number of chemical examinations showing an increase of 17 per cent. on the number in the preceding year. The Director remarks that there is some scepticism as to the practical value of these examinations, and notes that as opportunity offers, a critical analysis will be made of the results so far obtained to show whether such opinion is justified. There was a fall of 11·5 per cent. in the number of specimens sent for examination, chiefly under the headings, plague in animals, malarial parasites

and leucocytosis with differential counts, but there were increases under other headings such as human plague. The investigation, begun in 1910, to shew whether syphilis in one or other of the parents is the cause of the large number of still-births in which the fœtus is extruded in a mascerated condition was continued. A large number of such fœtuses were examined, and the organism of syphilis was demonstrated in 25 per cent., or the same percentage as in the previous year. It is said that this percentage may be regarded as closely approximating that in which it is possible to demonstrate the spirochæte, but does not exclude syphilis as a possible cause of many of the cases in which the organism could not be found. It is noted that without exception when spirochætes have been demonstrated they have been seen in the liver, next in order of frequency comes the kidney, and it is suggested that it would probably suffice for the purpose of this investigation if the liver only was examined.

Captain Patton continued his investigations into the etiology of Oriental Sore or Cambay Boil and with the experience gained was able to advance a step further in the corresponding experiments with the parasite of Kala Azar. A new feature is furnished by the work of Captain Cragg (Acting Assistant Director) on the structure of the proboscis of *Philæmatomyia insignis*, which throws an interesting light on the structural alterations which take place in flies as they assume a parasitic habit.

As noted before, the work connected with vaccines increased, over 1,600 doses of bacterial vaccines, both autogenous and stock vaccines, being supplied. The usual class for vaccinators was held during the year, 20 students attending, of whom 19 qualified. The Minor Sanitary Engineering class is now held in the Sanitary Engineer's office as being more convenient.

At the *Pasteur Institute, Kasauli*, the number of patients afforded anti-rabic treatment during the year 1911 shewed an increase of 195 over the number treated in 1910: as the Director remarks "it is difficult to see what is really to be the limit to this increase." The total number of patients was 2,268, and they came from all provinces, except Madras and Coorg, and the Native States of Rajputana, Kashmir and Nepal. The number of European patients was fewer than in the year before—297 against 354—but that of Indians was greater, 1,971 against 1,719. From the British Army there were 83 compared with 136 in 1910 and from the Indian Army (including British officers, their wives and children) 111 compared with 157. European and Indian civilians numbered 195 and 1,879 compared with 165 and 1,615, respectively, in the preceding year. Of the total number of patients 43, of whom one was a European, died of hydrophobia. Of these 12 developed symptoms of the disease within the course of treatment which lasts 18 days, 17 within 15 days of completion of the course, and 14 after 15 days. According to custom the last mentioned are regarded as "Failures." The report contains a table giving details of mortality not hitherto published for this or any other Institute. The table covers the period from 1900-01 to 1911 and is of sufficient interest to be reproduced here.

Death rates—Treated—Kasauli, 1900-1911.

Year.	Total treated.	"Failures."	Per cent.	Total deaths.	Per cent.	Indians.			Europeans.				Cases not undertaking treatment (advice).
						Treated.	Deaths.	Per cent.	Treated.	Deaths.	Per cent.	Failures.	
1900-01 ...	321	3	0·9	10	3·1	175	9	5·1	146	1	0·7	...	...
1901-02 ...	543	7	1·3	13	2·4	328	11	3·4	215	2	0·9	1	20
1902-03 ...	584	6	1·0	12	2·1	315	12	3·8	269	1	0·4	...	10
1903-04 ...	612	5	0·8	10	1·6	364	10	2·7	248	...	...	...	50
1904-05 ...	877	7	0·8	12	1·4	570	12	2·1	307	...	...	...	111
1905-06 ...	1,145	7	0·6	21	1·8	803	19	2·4	342	2	0·6	1	117
1906-07 ...	1,308	10	0·7	19	1·5	856	17	2·0	452	2	0·4	1	76
Interim, 9th August 1907—31st December 1907 ...	519	1	0·2	5	1·0	373	4	1·1	146	1	0·7	1	...
1908 ...	1,389	5	0·4	26	1·9	1,047	24	2·3	342	2	0·6	...	95
1909 ...	1,941	11	0·6	28	1·4	1,451	25	1·7	490	3	0·6	...	125
1910 ...	2,073	4	0·2	26	1·2	1,719	26	1·5	354	...	...	...	328
1911 ...	2,268	14	0·6	43	1·9	1,971	42	2·1	297	1	0·3	1	473
Total ...	13,580	81	0·6	225	1·7	9,972	202	2·0	3,608	15	0·4	5	

The report also contains tables giving details of the fatal cases, which suggest that on the whole it is the most badly bitten person who succumbs earliest, and the longer incubation periods are manifested by those less severely bitten.

The work of the Institute as a provincial Bacteriological Laboratory was represented by the examination of 1,052 specimens, of which 669 were from the Punjab, against 1,438 and 814, respectively, in the previous year.

The report records the deplorable loss to the Institute by the death, early in the year, of Major G. Lamb, I.M.S., the Director, who was early associated with Sir David Semple in the development of the Institute, and to whose initiative is largely due the present Laboratory accommodation.

At the *Pasteur Institute of Southern India, Coonoor*, the total number of patients treated increased from 827 during the year ending 29th February 1911 to 940 during that ending 29th February 1912. Of these—the figures in brackets are for 1909-10—the Europeans numbered 73 (148), Eurasians 57 (73) and Indians 810 (606). From the British Army there were 37 patients and from the Indian Army (including British officers, their wives and children) 30. The patients came from Southern India, including Native States, Burma, Ceylon, French India and the Federated Malay States. Of the total number treated, 8—all Indians—died from hydrophobia, but excluding cases that died within less than 15 days of treatment, the percentage of failure was 0·53 against 0·72 in the previous year.

From 30th January 1912, in place of the dilution method of treatment, the use of brain substance killed by heat or chemicals was adopted, a great advantage being that the vaccine can be kept for some time without danger of contamination or deterioration and thus being more economical in the number of rabbits required.

The other work done at the Institute included experiments in treatment by carbolized vaccine and other researches on rabies and immunity.

The scheme for the establishment of a *Pasteur Institute for Burma* has received the sanction of the Secretary of State for India.

Indian Research Fund Association.

143. During the year "The Indian Research Fund Association" was established, having for its objects the prosecution and assistance of research, the propagation of knowledge, and experimental measures generally in connection with the causation, mode of spread and prevention of communicable diseases. The control and management of the affairs, funds and work of the Association is vested in and rests with a Governing Body. The rules and regulations of the Association are as follows:—

President.

The Honourable Member of the Governor General's Council in the Department of Education.

Members.

The Secretary to the Government of India, Department of Education.

The Director-General, Indian Medical Service.

The Sanitary Commissioner with the Government of India.

The Director, Central Research Institute, Kasauli.

The Secretary to the Director-General, Indian Medical Service (Sanitary).

The Officer in charge of the Malaria Bureau.

2. The President of the Governing Body shall have the power to fill vacancies in, and make appointments to, that Body.

3. The Assistant or Under Secretary to the Government of India in the Department of Education shall be, by virtue of his office, Secretary to the Governing Body.

4. The members of the Association shall be of two classes, *viz.*—(*a*), Permanent Members; (*b*) Temporary Members.

The following shall be permanent members :—

(1) The President and members of the Governing Body.

(2) Every donor of Rs. 5,000 and upwards.

The following shall be temporary members :—

(1) All members of the Working Committees hereafter mentioned, provided that they are not already permanent members of the Association.

(2) Every subscriber of Rs. 100 and upwards annually during the currency of his subscription.

5. Every member of the Association shall be entitled to attend and take part in the annual general meeting of the Association, and to receive copies of the reports and other publications, issued from time to time by the Association.

6. The Governing Body shall appoint a "Scientific Advisory Board", of whom not less than three shall be members of the Governing Body, who shall examine all proposals in connection with the scientific objects of the Association, which may be submitted to the Governing Body, and report as to their feasibility. The members of such Board shall be appointed for one year but shall be eligible for re-election. They shall have power to add to their number.

7. The scientific objects of the Association shall be carried out with the aid of "Working Committees." Such committees shall be appointed by and work under the direction of the Scientific Advisory Board.

8. No scheme shall be financed by the Association, unless carried out with the sanction of the Governing Body, and approved by it, and no subscription or donation shall be made from the funds of the Association to any object which is not approved by the Governing Body.

9. Subject to the conditions laid down in rule 8, the funds of the Association (both capital and interest) shall be under the entire control of the Governing Body for the scientific objects of the Association and shall be applicable to the payment of current expenses and charges incidental to the execution of the duties of the Governing Body, of the Scientific Advisory Board and the Working Committees under the Rules and Regulations.

10. The accounts of the Association shall be kept by the Secretary to the Governing Body in such form as the Governing Body may prescribe, and shall be audited at the end of the financial year by such officer as may be appointed for that purpose by the Government of India.

11. A statement of the accounts of the Association shall be prepared as soon as possible after the 1st of April in each year, and shall be submitted to the Governing Body, who shall prepare for the information of the Government of India and of the members of the Association an annual report of the proceedings and of all work undertaken during the year.

12. The Association, through its Governing Body, may accept the management of any endowment or trust fund, or subscription or donation, provided that they are unaccompanied by any condition inconsistent or in conflict with the nature, object and provisions of the scheme. All property purchased with the funds of or acquired by or on behalf of the Association shall be held in the name of the President of the Governing Body.

13. A general meeting of the Association shall be held once in every year, as soon as possible after the preparation of the annual accounts and report, at such place and time as the Governing Body may appoint.

Meetings of the Governing Body, the Scientific Advisory Board, and the Working Committees shall be held as often as may be necessary.

14. The Governing Body may frame such rules as may be necessary for the discharge of business generally including the conduct of correspondence and the holding of meetings.

In accordance with the rules, a Scientific Advisory Board was elected by the Governing Body as follows :—

THE HON'BLE SURGEON-GENERAL SIR PARDEY LUKIS, M.D., K.C.S.I., F.R.C.S.,
Director-General, Indian Medical Service.

SIR DAVID SEMPLE, KT., R.A.M.C. (RETIRED),
Director, Central Research Institute, Kasauli.

MAJOR S. R. CHRISTOPHERS, I.M.S.,
Assistant Director, Central Research Institute, Kasauli.

MAJOR A. G. MCKENDRICK, I.M.S.,
Secretary to the Director-General, Indian Medical Service (Sanitary).

Sir Ronald Ross was elected Honorary Consulting Member of the Board.

The Scientific Advisory Board recommended the institution of active enquiries with regard to Kala Azar and Cholera, action in respect of other diseases being taken as circumstances dictate.

Kala Azar.—For the investigation of Kala Azar, a committee under the orders of the Hon'ble Surgeon-General W. B. Bannerman, I.M.S., with Major Christophers, I.M.S., and Dr. C. A. Bentley as members, was formed, and Captain F. P. Mackie, I.M.S., and Dr. V. T. Korke were appointed to conduct the enquiry; with these officers Captain W. S. Patton, I.M.S., who had been placed on deputation by the Government of Madras to conduct enquiries into the same disease, was associated in order to co-ordinate the work. An account of the work so far carried out will be found in the Proceedings of the Third Meeting of the General Malaria Committee held at Madras in November 1912.

Cholera.—Major E. D. W. Greig, I.M.S., was appointed to conduct an investigation into cholera, and an account of the work carried out will be found in papers contributed by him to the All-India Sanitary Conference, held at Madras in November 1912.

Among the measures recommended by the Scientific Advisory Board during the year, may be mentioned the allotment of a grant of Rs. 30,000 for the extension of the Central Research Institute, Kasauli, a grant of Rs. 5,000 for fitting up the laboratory in connection with the extension scheme, grants of Rs. 500 for the purchase of books for the Malaria Bureau attached to the Central Research Institute, Kasauli, and of Rs. 300 for the purchase of scientific journals for circulation among divisional and brigade bacteriological laboratories.

Yellow Fever.

144. In view of the opening of the Panama Canal and the danger of the introduction of Yellow Fever into India, it was considered to be of importance that prior to the actual opening, the Government of India should have definite first-hand information regarding the conditions in Central America where Yellow Fever is endemic, and in the principal ports between Central America and India, to admit of adequate measures being devised to prevent the introduction of the disease into this country. Major S. P. James, I.M.S., was accordingly deputed in October 1911 to proceed to the endemic area by the route that will be followed by ships coming to India when the Panama Canal is opened.

As a further measure in connection with precautions against the introduction of Yellow Fever into India, a survey of the principal Indian sea-ports in connection with *Stegomyia fasciata*, which carries the disease from man to man, was instituted and is in progress. An account of the work so far conducted will be found in the proceedings of the Third Meeting of the General Malaria Committee held at Madras in November 1912. In this connection it may be mentioned that at the suggestion of the Government of India, the Government of Ceylon has arranged to conduct a similar survey of the principal ports in the Island, and for this purpose the services of Major S. P. James, I.M.S., have been temporarily lent to the Colonial Government.

Malaria.

145. In the report for 1910 reference was made to the proceedings of the Second Meeting of the General Malaria Committee, published in No. 4 of Paludism and the resolutions passed were reproduced. The Third Meeting of the Committee was held at Madras in November

1912, and the proceedings are published separately. These contain an account of the work of the Central Malaria Bureau and the work done in the several provinces. It will suffice to reproduce here the resolutions passed at the meeting, which were as follows :—

1. That after another year's experience and investigation this Meeting desires to endorse and again bring to notice the Resolutions passed by the last Meeting as noted below :—

(*i*) This Meeting is of opinion that researches by experts in the field such as those carried out by Christophers and Bentley, prove the value of preliminary scientific investigation, and seem to point the probability that anti-mosquito measures may not prove so costly as was at one time feared.

(*ii*) The Meeting believe that no one measure can be suitable for all the conditions that favour the prevalence of malaria ; the quinine prophylaxis to be applied to a free population is difficult to carry out in the thorough way necessary for success ; and that a combination of several measures may be required as local circumstances may indicate. The Meeting is of opinion that notwithstanding the difficulties of quinine prophylaxis it cannot be too strongly emphasized that under the peculiar conditions of the Indian populace arrangements for the treatment by quinine of those sick from malaria is a matter of primary importance from the point of view of saving life, of preventing suffering, and of destroying a potent source of infection.

(*iii*) The Meeting desires to call the attention of Government to the possibility of danger arising from borrow pits in the proximity to human habitation especially when such excavation would result in stagnation of water therein.

(*iv*) The Meeting is of opinion that the education of the people is a most important anti-malarial measure and that every effort should be made to secure the co-operation of the public without which there is little hope that the campaign against malaria will ever be crowned with success. They believe that instruction in schools as well as lectures and lantern demonstrations in villages and towns are the best methods of propagandism and that in this way information is more likely to reach the people than by the publication of pamphlets and posters.

(*v*) The Meeting while strongly recommending the prosecution of further research is of opinion that although expert investigation is still necessary, enough is known as to the breeding habits of mosquitos, etc., to make it frequently possible for trained workers to deal with malaria in an efficient manner.

2. That in view of the correlation which certain observers have found to exist between density of jungle in and around villages on the one hand and intensity of malaria on the other it is desirable that this question should receive careful attention of all those working at malaria in India with a view to the collection of information for discussion at the next Meeting.

3. That experience in the United Provinces and elsewhere has shown that the regular administration of quinine to children in schools during the malarial season is a practical measure of proved utility and of easy application ; and that this measure in addition to its immediate effect on health, is likely to prove a powerful aid in the spread of knowledge regarding the uses of quinine both in the prevention and cure of malaria.

4. That amongst methods of combating malaria this Meeting desires to lay special stress on general methods of water tidiness such as the filling up or draining of pools in which dangerous mosquitos may breed and the cleaning and trimming of the edges of all tanks or water courses situated in the proximity of villages, so as to deprive the mosquito larvæ of the protection against their

natural enemies afforded by weeds; and that in rural areas this object can best be attained by the formation of anti-malarial societies, on the lines of the Coronation anti-malarial Society recently started at Jessore.

5. In view of the fact that investigation has shown that the cultivation of rice and other crops for which an abundance of water is necessary during growth, need not lead to the formation of dangerous breeding grounds for mosquitos, it is desirable in the interests of agriculture in India to definitely ascertain the precise conditions under which such cultivation is or is not likely to be harmful.

6. That the provision of a pure and protective water-supply and any means whereby the health of a population can be improved and its powers of resistance to disease increased, must be regarded as important measures of sanitation, useful alike against malaria and other diseases both in urban and rural areas.

7. That further research is necessary with a view to ascertaining the most effective larvicides, and natural enemies of the mosquito, and which of them are best suited for use in particular localities and under different conditions of environment. Also that it is desirable to consider the advisability of constructing ponds in centres where permanent water can be obtained, for the breeding on a large scale and the distribution of the more important of the natural enemies of mosquito larvæ.

8. That pending the completion of the Stegomyia surveys this Meeting is not in a position to express any opinion as regards the practicability of the extermination of this mosquito or its reduction to non-dangerous numbers in our chief ports.

9. That further enquiries are necessary into the etiology and modes of transmission of the various forms of Spirochætal inspection and of the fevers of short duration such as Dengue, "seven day" and "three day" fevers, the pathogenic organisms of which appear to be closely allied to that of Yellow Fever.

10. That, whilst continuing the examination of dogs and the laboratory experiments in connection with the etiology and modes of transmission of Kala Azar, further field investigations should be undertaken both in Madras, Bengal and Assam with a view to ascertaining what are the conditions specially favourable for the spread of the disease.

Special enquiries.

146. Two special enquiries in connection with the investigation of malaria have been conducted under the direction of the Sanitary Commissioner with the Government of India one a malarial survey of the new Imperial Delhi and the other of Bharatpur City.

New Imperial Delhi.—The survey was entrusted to Captain E. C. Hodgson, I.M.S., Officer in charge of the Malaria Bureau at the Central Research Institute, Kasauli, assisted by an adequate staff, and was begun in July 1912. The report on the investigation has not yet been received.

Bharatpur City.—A preliminary enquiry into the unhealthiness of the city suggested that the heavy mortality was largely epidemic and might be to a great extent preventible: the most important cause was found to be malaria. A detailed investigation was found to be necessary and it was accordingly decided to employ a special officer to conduct the enquiry. The Darbar employed Dr. R. B. Khambatta for a period of three months to work under the directions of the Sanitary Commissioner with the Government of India, and further action in the light of the information obtained will now be possible.

Instruction in Malaria.

147. The fourth class of instruction assembled at Amritsar and lasted from the 15th March to the 27th April 1912 under Major S. R. Christophers, I.M.S. The class was attended by 5 civil and 8 military medical officers and by 12 civil and 8 military medical subordinates, making a total of 33.

The fifth class assembled at Delhi on the 1st October and the period of instruction under Captain E. C. Hodgson, I.M.S., extended to the 10th November

1912. The class was attended by 8 military medical officers, 10 civil and 6 military medical subordinates, making a total of 24, to whom training in malaria work was given.

During the year the sanction of the Government of India was accorded to these classes being assembled to the extent and at the times found convenient for the purpose.

Improvement and strengthening of the sanitary services in India.

148. In Education Department Resolution No. 921-36 (Sanitary), dated the 23rd May 1912, the Government of India announced that for some time they had had under their consideration the question of the improvement and strengthening of the sanitary services in India. While acknowledging that the administrative machinery of the Sanitary Department was already in most respects fairly complete and efficient, the Resolution stated that the improvements it was desired to effect were in the direction of further decentralisation of control; of widening the field of recruitment by throwing open the higher posts to fully qualified Indians of proved aptitude and of strengthening the staff in some provinces in which it was admittedly inadequate. It was announced that the Government of India had authorized all local Governments, in addition to those of Madras and Bombay which already had the privilege, to appoint their own Sanitary Commissioners from officers serving in the province, provided that no officer with less than 15 years' service be appointed, and that the orders fixing a limitation to the tenure of appointment had been withdrawn. The Government of India also intimated the decision to create eight additional appointments of Deputy Sanitary Commissioners, two each in Madras, Bengal and the United Provinces, and two which were originally proposed for Eastern Bengal and Assam. The appointments of Deputy Sanitary Commissioner were no longer to be reserved for officers of the Indian Medical Service and Indians possessing the necessary qualifications should be eligible for appointment. The selection of candidates should rest with local Governments subject to certain conditions. It was directed that the rates of pay for Deputy Sanitary Commissioners not belonging to the Indian Medical Service should range between Rs. 500 on appointment to Rs. 900 after 16 years' service: for approved service after 20 years' service Rs. 1,000 should be given up to 25 years which would ordinarily be the limit of service and that these appointments shall be non-pensionable.

With respect to Sanitary Boards in the several provinces, the Government of India left their constitution to be determined by local Governments with reference to the functions with which they are to be entrusted.

It was also mentioned that the scheme sanctioned provides for the appointment of health officers of the first class for larger municipalities and of the second class for smaller towns. The rates of pay considered suitable for the former was fixed at Rs. 300—20—500 (with higher rates in exceptional cases) and at Rs. 150—10—300 for the latter.

The Government of India considered it desirable that a service of trained sanitary inspectors should be organized in municipalities, based on such standard of population, income or area as commended itself to local Governments, leaving it to them to determine the qualifications of candidates, the course of training and the rates of pay to be granted.

Sanitary Conferences.

149. The first All-India Sanitary Conference was held at Bombay on the 13th and 14th November 1911, under the presidency of the Honourable Mr. S. H. Butler, Member of the Governor General's Council in the Department of Education, and was attended by 29 delegates representing all the provinces, and one delegate also attended from Ceylon. The full proceedings of the Conference have been published separately.

The second All-India Sanitary Conference was held at Madras from the 11th to 16th November 1912, under the presidency of the Honourable Sir Spencer Harcourt Butler, Member of the Governor General's Council in the Department of Education, and was attended by delegates from all the provinces, from the Native States of Mysore and Hyderabad and also from Ceylon.

Papers were contributed on the following subjects. (1) Town planning, building bye-laws, etc.; (2) Travelling dispensaries; (3) Plague; (4) General sanitation; (5) Urban water supplies; (6) Water Analysis; (7) Vaccine lymph; (8) Microscopical

and practical demonstrations in microbiology; (9) Dracontiasis; (10) Sleeping Sickness; (11) Experimental and mechanical filters and sewage disposal at the King Institute, Madras; (12) Water and Drainage Works, Madras City; (13) Cholera; (14) Hygiene; (15) Dysentery; (16) Tuberculosis; (17) Fevers; (18) Sewage and refuse disposal; (19) Milk supply; (20) Vital statistics; (21) Village sanitation; (22) Inspection of food and drugs and (23) Rural water supplies.

The following resolutions were passed at the Conference:—

(1) Town planning and congested areas.

(*a*) That the introduction on modern lines of town-planning schemes for the extension of towns and the relief of congested areas in towns are among the most urgently required sanitary needs in India and that the time has come for experimental action on these lines in selected towns.

(*b*) That the term "public purpose" in the preamble of the Land Acquisition Act should be held to include the acquisition of so much land immediately adjacent to the land required for any public improvement as it may be necessary to acquire in order to complete that improvement in the interests of the community or to make it financially possible.

(*c*) That in order to meet the cases in which it is financially impracticable to apply the Land Acquisition Act, an Act should be introduced on the general lines of the English Act and in particular embodying under necessary safeguards, the English Act principle of betterment, under which the local authority has a right to a share in the improved value which results from the carrying out of the improved scheme and also the German Act principle of redistribution by which power is given to duly constituted authority to alter the shapes of and otherwise rearrange plots so as to render them more suitable for building purposes.

(*d*) That in congested areas action is desirable on the general lines of the provisions of the English Housing of the Working Classes Acts of 1890 and 1909 adapted to local conditions in India and in particular with reference to:—(*a*) empowering local bodies to prepare and carry out improvement schemes in insanitary areas and strengthening their powers in dealing with obstructive and unhealthy houses; (*b*) simplifying the procedure for acquisition of such areas and for assessment of compensation, (*c*) securing the regular inspection of insanitary dwelling houses and prompt action in dealing with defects.

(*e*) That in all towns in India local bye-laws should be examined and where necessary revised with a view to the provision of sufficient air, light and ventilation in every house and room according to prescribed standards suited to local conditions; that after a period of grace there should be an absolute veto on the occupation of rooms which fail to reach these standards; that provision should be made to prevent overcrowding and that sanitary officers should be employed with powers sufficient to see that such bye-laws are enforced.

(*f*) That in all action affecting their dwellings it is especially important to study the habits, requirements, and financial means of the people, and where possible to enlist the co-operation of the leading residents in support of that action.

(*g*) That as a measure of demonstration and education efforts should be made in different parts of India to construct a model town or quarter of a town, with broad roads, sufficient air, light and ventilation, at least before and behind each house, good water-supply and lighting, efficient drainage and conservancy, rat-proof and mosquito-proof houses, in which overcrowding is not allowed, up-to-date markets, slaughter houses, bathing places, open spaces, recreation grounds, and an ample sanitary staff under expert supervision.

(2) Travelling Dispensaries.

That experience in Upper India has demonstrated that under proper supervision and in suitable localities travelling dispensaries of a simple kind, apart from the question of medical relief, are measures of utility as instruments for the education of the people and as the means of reconciling them to modern methods of disease prevention.

(3) Water Supply.

That the attention of Local Governments and the Indian Research Fund be earnestly invited to the advisability of an exhaustive enquiry into the following matters:—(a) The difficulties of silt removal from river-water-supplies. (b) The most suitable methods of water analysis and the possibility of fixing definite bacteriological standards for India. (c) The plans to be adopted for conveying samples of water to and fromdistant laboratories.

(4) Cholera.

That there is strong evidence to show that in India in addition to contaminated water the four following factors are of great importance in the spread of this disease:—(a) Convalescents discharged while still infective. (b) Healthy persons who have been in contact with cholera cases and have acquired the infection without showing any signs of the disease but who are excreting cholera vibrios in their stools. (c) Flies. (d) The personal habits of the people.

(5) Plague.

That encouraging advance has been made in the knowledge of the etiology and epidemiology of plague and that research should be continued on the present general lines. That the results of recent enquiries point to the special importance of action in the following directions:—

(*a*) It is advisable to bring forcibly to the notice of the public the importance of the rat as an essential factor in the causation of plague and that plague preventive measures which aim at controlling human beings alone are insufficient and that it is more important to carry out those measures of permanent utility which tend to lessen the rat infestation of the house, such as house tidiness and improved scavenging, the prohibition of the housing of live-stock within the precincts of human dwellings and the provision of ample light and air in every room in the house. (*b*) Rats infected with plague are more responsible for the carriage of infection from one place to another than persons suffering from the disease, therefore grain stores and grain markets where these animals abound play a large part in the spread of plague so that the protection of grain in grain dealers' shops, the construction of rat-proof grain godowns and where possible their erection at some distance from human habitations are useful plague preventive measures. (*c*) Localities infected late in one plague season are important sites of early epidemics in the next and thus potential foci of widespread infection. Special attention therefore should be directed to the definite location of such localities and the energies of the plague preventive staffs, instead of being relaxed, should be concentrated on them during the quiescent period, assisting the natural forces which at this season tend to obliterate infection by well organized schemes of rat destruction, inoculation, and evacuation, and general sanitation measures should also be taken to prevent as far as possible the transference of infection to other places from these infected foci.

(6) Tuberculosis.

That statistics appear to show that this disease is rapidly increasing in India especially in urban areas but that it is doubtful whether the increase is a real one or apparent only, and due to such causes as more accurate diagnosis and registration. In view of the importance of this question a full and thorough enquiry seems desirable. That the following measures are recommended to check further spread of this disease:—

(*a*) The improvement of general sanitation and the opening up of congested areas, the provision of ample light and air in all inhabited rooms both in private dwelling houses and in schools. (*b*) The formation of anti-tuberculosis societies. (*c*) The establishment of tuberculin dispensaries. (*d*) Efficient control of milk supplies. (*e*) Compulsory notification of the disease at any rate in the larger towns.

(7) Dysentery.

That this disease is a cause of much sickness and mortality throughout India generally and that, while clinically it presents a clear and definite picture, much uncertainty and doubt still exist as to the causation of its different varieties. Seeing that on our knowledge of this depend both treatment and prevention, it appears desirable that the whole subject should be carefully and thoroughly investigated *ab initio*.

(8) Flies.

That much evidence exists incriminating the common house fly as a factor in the spread of such diseases as enteric fever, cholera, diarrhœa, dysentery and tuberculosis. Various expedients for the reduction of flies, such as incineration of rubbish and night-soil, shallow trenching, the use of perchloride of mercury or saponified cresols in latrines, have been suggested, but none of these are universally applicable. More work is required to ascertain definitely the more important breeding places of flies and how best to deal with them, but the Conference desires to impress upon local authorities the importance of thorough scavenging and of careful attention to night-soil trenches as it is clearly proved that fermenting animal and vegetable matter of all description is the favourite breeding ground of the domestic fly.

(9) Rural Water Supplies.

That impure water supply is one of the principal causes of sickness and mortality in the rural areas of India, and is for this reason a matter deserving the most careful attention of Government. The most hopeful line of action would appear to lie in the encouragement of a more extended use of tube wells and pumps, and further endeavour should be made to popularize this method of protecting water supplies from pollution.

(10) Research.

That in view of the many problems of disease prevention which remain untouched in India the programme of research should be enlarged, the number of trained investigators being increased where necessary.

(11) Meetings of the Sanitary Conference.

That the meetings of the Sanitary Conference should continue to be annual.

(12) Subjects for the next Conference.

That the following subjects be specially considered at the next Conference, *viz.* :—

(A). Sanitary Section.

(*a*) The obtaining of vital statistics of sufficient reliability to serve as the basis of schemes of sanitary reform and judgment of their results. (*b*) Incinerators : their limitations and possibilities in different places, with reference to local climatic conditions, combustibility of rubbish, and cost. (*c*) Notification of diseases : how far it is possible to make certain diseases compulsorily notifiable and what these diseases should be. (*d*) Medical inspection of schools : suggestions as to how this might be made possible, and the agency to be employed. (*e*) Milk supply : the present defects and how these can be obviated ; standards of purity ; inspection, feeding and housing of milch cattle, registration and supervision of dairy men, and dairies. (*f*) The education of teachers and school children in hygiene : how best this can be carried out.

(B) Engineering Section.

(1) Width of cart tyres, (2) Suitable designs for (*a*) Markets, (*b*) Slaughter houses (*c*) Latrines and night soil depôts, (*d*) Grain godowns, (*e*) Sewer connections, (*f*) Cowsheds, (*g*) House connection and meters for water supply, (*h*) Model

dwellings for the poorer classes. (3) The use of cast iron, steel and ferro concrete pipes for water supply and drainage works. (4) Statistics of consumption of water in water works. (5) Water supply and Drainage bye-laws. (6) The improvement of water supply and drainage in municipalities and villages. (7) Tube wells. (8) Statistics of pumping per pump horse power per hour.

Scientific Publications.

150. Since the issue of the last report the following numbers of the Scientific Memoirs have been published:—

No. 50. *Preliminary Report on an investigation into the etiology of Oriental Sore in Cambay*, by Captain W. S. Patton, M.B., I.M.S. No. 51. *A streptothrix isolated from the spleen of a leper*, by Major W. G. Liston, M.D., D.P.H., I.M.S., and Captain T. S. B. Williams, I.M.S. No. 52. *Dysentery in Hazaribagh Central Jail, January 1910—March 1911*, being the report of an enquiry carried out by Captain R. T. Wells, M.A., M.B., I.M.S. No. 52-A. *The physiological action of certain drugs in tablet form*, by Major H. M. Mackenzie, I.M.S. No. 53. *The development of the parasite of Indian Kala Azar*, by Captain W. S. Patton, M.B., I.M.S. No. 54. *Studies on the mouth parts and sucking apparatus in the blood-sucking diptera, No. (1) Philæmatomya insignis, Austen*, by Captain F. W. Cragg, M.D., I.M.S. No. 55. *The structure of Hæmatopota pluvialis (meigen)*, by Captain F. W. Cragg, M.D., I.M.S. No. 56. *Malaria in the Andamans*, by Major S. R. Christophers, M.B., I.M.S. No. 57. *Studies on the flagellates of the genera Herpetomonas Crithidia and Rhynchoidomonas, No. (1) The Morphology and Life History of Herpetomonas culicis, Novy, MacNeal and Torrey*, by Captain W. S. Patton, M.B., I.M.S. No. 58. *Studies on the mouth parts and sucking apparatus of the blood-sucking diptera, No. (2) some observations on the Morphology and mechanism of the parts in the Orthorrapha*, by Captain F. W. Cragg, M.D., I.M.S. No. 59. *Studies on the mouth parts and sucking apparatus of the blood-sucking diptera. No. (3) Lyprosia Minuta Bezzi*, by Captain F. W. Cragg, M.D., I.M.S.

Nos. 4 and 5 of *Paludism*, being the transactions of the Committee for the study of Malaria in India, have also been published. A pamphlet entitled—*Sleeping Sickness, a summary of the work done by the Sleeping Sickness Commission, 1908—1910*, by Captain F. P. Mackie, I.M.S., was published and copies distributed to all officers of the Indian Medical Service in India.

The Hon'ble Major J. C. Robertson assumed charge of the appointment of Sanitary Commissioner with the Government of India with effect from 17th May 1912.

STATISTICAL TABLES, 1911.

Table No.				Page.
I.—	European Troops.—	Summary.—	Sickness and Mortality by Geographical groups.	78—79
II.—	„	„	Ratios of Armies	80
III.—	„	„	„ „ Geographical Groups ...	81
IV.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	82
V.—	„	„	Statistics of Officers.—Sickness and Mortality among Officers of Brish Arm	83
VI.—	Indian Troops.—	Summary.—	Sickness and Mortality by Geographical Groups.	84—85
VII.—	„	„	Ratios of Armies	86
VIII.—	„	„	„ „ Geographical Groups	87
IX.—	Prisoners.—	Summary.—	A.—Sickness and Mortality by Administrations.	88—89
	„	„	B.—Sickness and Mortality by Geographical Groups.	90—91
X.—	„		Ratios of Administrations	92
XI.—	„	„	„ Geographical Groups	93
XII.—	General Population.—		Provincial Birth and Death Statistics ...	94
XIII.—	„	„	Births	95
XIV.—	„	„	Deaths	95
XV.—	„	„	„ in Towns and Rural Circles ...	96
XVI.—	„	„	„ according to Age	96
XVII.—	„	„	„ „ „ Cause	97
XVIII.—	„	„	„ by months	98
XIX.—	„	„	Ratio of Deaths according to months ...	98
XX.—	„	„	Deaths from Cholera, by Provinces, 1880-1911	99
XXI.—	„	„	Deaths from Cholera, by months, in 1911 ...	100
XXII.—	„	„	Details of distribution and occurrence of Cholera in 1911.	100
XXIII.—	„	„	mortality from small-pox	101
XXIV.—	„	„	„ „ Fever	102
XXV.—	„	„	„ „ Dysentery and Diarrhœa ...	103
XXVI.—	„	„	„ „ Plague	104
XXVII.—	„	„	„ „ Respiratory Diseases ...	105
XXVIII.—	„	„	Vaccination	106

TABLE NO. I.—*Summary, Sickness and*

Groups.	Years.	Average strength*.	RATIO PER					
			Constantly sick.	Invaliding.	Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1901-1910	1,200	58	19·9	8·6	...	...	·08
	1910	1,317	30	14·4	12·1	...	...	...
	1911	1,210	27	8·3	19·0	...	...	...
„ II.—Burma Inland	1901-1910	1,919	58	21·6	1·8	...	1·4	1·04
	1910	1,893	35	2·1	...	...	...	...
	1911	1,219	37	...	...	...	...	...
„ IV.—Bengal and Orissa	1901-1910	1,843	62	34·1	12·5	...	·7	·49
	1910	2,041	25	7·3	...	...	...	...
	1911	1,939	27	4·8	...	...	...	...
„ V.—Gangetic Plain and Chutia Nagpur	1901-1910	6,497	52	23·5	4·1	...	·7	·54
	1910	6,269	34	9·1	·3	...	1·0	·48
	1911	6,012	30	12·1	14·6	...	4·3	2·00
„ VI.—Upper Sub-Himalaya	1901-1910	13,126	54	23·5	7·6	...	·4	·27
	1910	13,775	32	7·3	1·7	...	...	...
	1911	14,142	29	7·9	2·8	...	·6	·35
„ VII.—North-Western Frontier, Indus Valley and North-Western Rajputana.	1901-1910	4,801	53	30·1	39·4	·02	·3	·31
	1910	5,064	34	7·1	19·2	...	...	...
	1911	5,600	34	6·8	7·3	...	...	...
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1901-1910	5,798	58	29·6	5·8	...	·1	·05
	1910	5,866	38	7·5	2·2	...	...	...
	1911	6,009	33	8·0	1·5	...	...	...
„ IX.—Deccan	1901-1910	9,951	51	21·4	2·8	·01	·5	·34
	1910	10,679	29	6·9	·9	...	...	...
	1911	11,240	27	5·3	·9	...	·4	·36
„ X.—Western Coast	1901-1910	1,517	55	20·4	1·9	...	·1	...
	1910	1,412	44	7·8	...	...	...	...
	1911	1,609	29	7·5	1·9	...	...	...
„ XI.—Southern India	1901-1910	3,512	55	20·6	2·4	...	·2	·09
	1910	3,235	35	12·4	·3	...	...	...
	1911	3,259	35	8·0	6·8	...	...	...
„ XII (*a*).—Hill Stations	1901-1910	10,778	41	17·7	6·4	·01	·3	·17
	1910	13,183	27	6·3	2·0	...	...	...
	1911	12,196	25	5·7	3·4	...	...	...
„ XII (*b*).—Hill Convalescent Depôts and Sanatoria ...	1901-1910	3,620	66	34·3	4·1	...	·2	·11
	1910	3,942	48	11·4	1·0	...	·8	·51
	1911	3,718	38	9·7	·3	...	...	...
India	1901-1910	68,663	52	24·4	7·5	·01	·5	·33
	1910	72,491	32	7·8	2·7	...	·1	·10
	1911	72,371	29	7·1	3·9	...	·1	·29

* The decennial ratios are worked on the total strength of the ten year period.

Mortality by Geographical Groups.

MILLE OF STRENGTH.

A.—ADMISSIONS FROM

D.—DEATHS FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All Causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·6	...	2·3	·42	115·1	·67	110·3	...	1·2	·25	28·6	1·83	259·1	·08	996·4	9·17
·8	...	·8	...	9·9	...	81·2	...	...	...	6·8	...	72·9	...	372·1	6·07
...	...	·8	...	30·6	...	111·6	...	1·7	...	3·3	...	52·9	·83	441·3	6·61
·1	...	4·4	1·35	223·5	1·09	55·3	...	2·0	·52	11·4	·31	195·7	·21	970·2	8·80
...	...	1·1	·53	74·5	...	112·0	...	·5	...	6·9	...	78·7	...	655·6	2·6
...	...	1·6	...	55·8	...	114·0	...	...	...	10·7	...	114·8	...	676·0	4·92
·8	·11	5·9	1·03	184·7	·76	62·2	...	3·6	·81	30·8	·81	252·5	·11	968·8	13·56
...	...	1·0	...	51·0	...	72·5	...	1·0	·49	7·3	·49	64·7	...	388·5	6·86
...	...	2·1	...	61·4	...	84·1	...	3·1	·52	16·5	·52	74·3	...	459·5	5·16
1·3	·12	17·9	3·38	135·4	·23	70·7	...	2·9	·35	16·0	·58	148·0	·08	814·9	11·34
...	...	6·2	·48	69·4	...	54·2	...	4·0	·32	6·9	·48	74·8	...	583·0	4·47
...	...	9·1	·50	51·7	...	53·6	...	3·3	1·00	10·6	·50	63·5	...	526·4	9·65
·5	·02	12·9	3·02	262·5	·48	42·8	·01	4·8	·62	11·0	·57	130·7	·08	927·7	11·22
...	...	·5	·02	17·9	5·2	167·0	...	1·7	·22	6·7	·15	48·1	·07	618·1	5·23
...	...	·3	...	12·1	·07	81·9	...	2·1	·14	4·3	...	46·5	·07	542·1	4·60
6.	1·0	1·6	·50	51·7	...	53·6	...	3·3	1·00	10·6	·50	63·5	...	526·4	9·65
...	...	4·9	·39	334·3	·39	35·0	...	3·8	·59	4·3	...	47·0	...	913·1	4·54
...	...	1·4	·89	137·5	1·81	41·8	...	4·5	·36	6·2	·36	48·6	...	830·6	5·18
4·1	·50	21·0	5·24	349·0	1·41	25·0	·07	3·4	·43	15·3	·64	170·6	·09	1,043·3	13·00
...	...	·9	1·19	287·4	1·51	15·0	...	2·4	·17	7·8	...	56·4	...	767·6	4·94
...	...	2·7	·33	165·3	...	6·0	...	2·0	·17	5·3	...	51·1	...	625·6	4·49
8.	·04	9·43	3·45	141·3	·60	30·4	...	2·8	·26	18·5	·45	185·9	·12	807·7	9·43
...	...	6·9	·93	65·9	...	26·6	...	1·8	·19	13·0	·37	69·0	...	452·7	4·40
...	...	5·0	·44	61·8	·60	15·9	...	1·6	·18	9·7	·36	56·4	...	428·9	4·18
8.	...	2·3	1·25	164·2	·96	6·0	...	2·8	·99	10·7	·07	210·0	·26	774·9	8·77
...	...	2·8	1·42	94·6	...	14·9	...	2·8	...	11·3	...	109·8	...	524·8	3·54
...	...	3·7	...	89·5	...	10·6	...	3·1	·62	4·4	·62	98·8	...	448·1	6·84
5.	·06	13·4	2·08	79·8	·14	30·8	...	2·3	·31	17·9	·17	203·9	...	862·9	6·75
3.	...	4·9	·31	69·7	·31	32·8	...	1·2	·31	10·8	·62	81·9	...	606·2	4·95
...	...	3·7	·19	96·7	...	16·9	...	·9	·31	1·81	·13	89·0	...	692·2	4·30
2.	...	10·7	1·96	85·5	·18	28·5	...	3·7	·56	8·4	·41	108·7	·16	657·4	6·70
1.	...	2·5	·23	85·5	·08	16·2	...	1·2	·38	4·6	·30	48·1	...	460·4	3·41
...	...	2·8	·25	95·5	·16	12·4	...	1·6	·08	7·3	·49	36·9	...	436·8	3·53
2.	...	12·0	2·24	196·3	·30	17·0	...	3·5	·41	13·9	·44	133·8	·28	896·3	9·97
...	...	7·6	1·27	166·4	...	31·5	...	2·3	...	5·8	·25	51·2	...	680·1	6·85
...	...	4·3	·27	82·6	·27	17·5	...	1·1	·27	10·0	·27	50·3	...	546·3	6·46
7.	·04	14·1	2·62	197·6	·35	39·6	10.	3·7	·47	14·3	·49	152·5	12.	854·2	16·6
0.	...	4·9	·63	132·0	·10	37·7	...	2·0	·25	7·7	·23	58·9	·01	576·5	4·99
0.	...	3·8	·33	90·2	·08	26·4	...	2·1	·26	7·7	·26	53·1	·03	524·7	4·89

EUROPEAN TROOPS.

TABLE NO. II.—*Ratios of Armies, 1911.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.		
	Northern Army.	Southern Army.	India.
I.—STRENGTH	37,715	32,059	72,371
II.—† CONSTANTLY SICK	28·7	31·2	28·8
III.—INVALIDINGS	7·74	6·96	7·12
IV.—ADMISSION RATE OF THE YEAR—			
Influenza	4·6	3·3	3·9
Cholera	·9	·1	·1
Small-pox	...	·0	·0
Enteric Fever	3·9	3·7	3·8
Malaria	86·1	99·9	90·2
Sandfly Fever	33·6	3·9	19·2
Pyrexia of uncertain origin	32·3	20·6	26·4
Tubercle of the lungs	1·1	·9	·9
Pneumonia	2·5	1·6	2·1
Respiratory Diseases	13·0	11·7	12·2
Dysentery	6·4	9·4	7·7
Diarrhœa	12·2	9·5	10·9
Hepatic Abscess	1·1	·9	1·0
„ Congestion and Inflammation	8·3	6·1	7·1
Venereal Diseases	47·3	61·9	53·1
ALL CAUSES ...	540·3	529·7	524·7
V.—DEATH RATE OF THE YEAR—			
Cholera	·45	·12	·29
Small-pox	...	...	...
Enteric Fever	·34	·34	·33
Malaria	·13	0·3	·08
Pyrexia of uncertain origin	...	...	...
Heat-stroke	·50	·12	·33
Circulatory Diseases...	·34	·16	·25
Tubercle of the lungs	·08	0·6	·07
Pneumonia	·34	·19	·26
Respiratory Diseases	·16	·06	·11
Dysentery	·27	·28	·26
Diarrhœa	...	...	·01
Hepatic Abscess	·42	·50	·46
ALL CAUSES ...	5·54	4·27	4·89

† Worked on the aggregates.

TABLE NO. III.—*Ratios of Geographical Groups, 1911.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XIIa Hill Stations.	XIIb Hill Convalescent Depots, and Sanatoria.	India.
I.—STRENGTH	1,210	1,219	1,939	6,012	14,142	5,600	6,009	11,240	1,609	3,259	12,196	3,718	72,371
II.—†CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH ...	26·5	37·4	27·4	29·6	29·3	34·4	32·6	27·0	28·9	34·5	24·5	38·4	28·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	19·0	...	...	14·6	2·8	7·3	1·5	·9	1·9	6·8	3·4	·3	3·9
Cholera	...	...	...	4·3	·6	...	...	·4	...	...	...	...	·1
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	·0
Enteric Fever	·8	1·6	2·1	9·1	3·0	4·1	2·7	5·0	3·7	3·7	2·8	4·3	3·8
Malaria	30·6	55·8	61·4	51·7	81·9	137·5	165·3	81·9	89·5	96·7	95·5	82·6	90·2
Sandfly Fever	...	...	...	18·6	28·3	133·9	1·3	9·3	...	...	1·5	...	19·2
Pyrexia of uncertain origin ...	111·6	114·0	84·1	53·6	24·6	41·8	6·0	15·9	10·6	16·9	12·4	17·5	26·4
Rheumatic Fever	·8	5·7	3·1	2·7	4·2	2·5	2·8	4·4	1·2	5·8	7·5	5·4	4·3
Tubercle of the lungs ...	1·7	·8	1·5	·5	1·0	·4	1·5	·6	...	·6	·8	3·8	·9
Pneumonia	1·7	...	3·1	3·3	2·1	4·5	2·0	1·6	3·1	·6	1·6	1·1	2·1
Respiratory Diseases ...	5·0	16·4	8·8	12·3	13·0	20·2	15·3	9·1	14·9	12·0	11·0	12·9	12·2
Dysentery	3·3	10·7	16·5	10·6	4·3	6·2	5·3	9·7	4·4	18·1	7·3	10·0	7·7
Diarrhœa	8·3	21·3	23·2	15·1	11·6	14·3	14·3	5·4	11·2	12·6	7·4	10·5	10·9
Hepatic { Abscess	...	·8	1·5	2·0	1·3	·7	1·2	1·2	·6	·6	·4	·8	1·0
Hepatic { Congestion and Inflammation ...	·8	9·0	10·3	9·3	7·4	6·2	16·1	5·8	6·2	2·8	4·6	8·9	7·1
Venereal Diseases	52·9	114·8	74·3	63·5	46·5	48·6	51·1	56·4	98·8	89·0	36·9	50·3	53·1
ALL CAUSES ...	441·3	676·0	459·5	526·4	542·1	830·9	625·6	428·9	448·1	692·2	436·8	546·3	524·7
V.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	2·00	·35	...	...	·36	...	...	...	...	·29
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	...	...	...	·50	·21	·89	·33	·44	...	·61	·25	·27	·33
Malaria	...	...	...	...	·07	·18	...	·09	...	...	·16	·27	·08
Pyrexia of uncertain origin ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	...	1·00	·71	·36	·50	·18	...	...	...	...	·33
Circulatory Diseases... ...	...	...	...	·83	·14	·36	...	...	·62	·61	·25	·54	·25
Tubercle of the lungs ...	...	·82	...	...	·07	·18	·17	...	...	...	...	·27	·07
Pneumonia	...	...	·52	1·00	·14	·36	·17	·18	·62	·31	·08	·27	·26
Respiratory Diseases ...	...	...	...	·17	·21	·18	...	·09	...	·31	...	·27	·11
Dysentery	...	...	·52	·50	...	·36	...	·36	·62	·31	·49	·27	·26
Diarrhœa...	...	...	...	...	...	...	...	...	...	...	...	...	·01
Hepatic Abscess	...	·82	·52	1·16	·28	·18	·83	·53	·62	·31	·16	·81	·46
ALL CAUSES ...	6·61	4·92	5·16	9·65	4·60	5·18	4·49	4·18	6·84	4·30	3·53	6·46	4·89

† Worked on the aggregates.

TABLE NO. IV.—*Admission and death rates from Enteric fever in stations of over 1,000 strength.*

Stations.	1911.		Decennium, 1901-1910.		Stations.	1911.		Decennium, 1901-1910.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Bareilly	16·8	·65	12·2	2·17	Ahmednagar ...	2·9	·97	14·4	3·32
Lucknow	15·4	1·22	25·5	4·23	Mhow and Indore ...	2·7	·55	24·0	4·90
Nowshera	6·4	·91	9·1	3·30	Meerut	1·8	·46	28·6	6·04
Kirkee	5·4	...	22·7	2·69	Chakrata	1·6	...	6·0	·85
Bangalore	4·9	·97	18·2	2·56	Ferozepore... ...	1·0	·99	11·7	3·38
Jubbulpore	4·8	·95	23·5	4·82	Rangoon	·9	...	2·5	·46
Wellington Depôt ...	4·8	...	8·4	·81	Forts William, Fulta and Chingrikhal.	·8	...	3·2	·26
Secunderabad ...	4·5	·32	17·5	3·70	Sialkot	·8	...	18·2	4·30
Lahore Cantonment and Fort.	4·5	...	18·8	4·04	Rawalpindi ...	·7	...	17·9	3·28
Karachi	4·4	·73	4·6	·96	Ranikhet and Chaubuttia	·5	...	14·6	2·31
Colaba	3·9	...	2·0	1·46	Ambala	...	...	17·3	3·82
Quetta	3·5	·29	15·3	2·82	Agra	...	...	17·2	4·85
Peshawar	3·0	1·19	20·4	4·96	Aden	...	...	5·4	1·42
Poona	3·0	...	21·1	3·96					

TABLE NO. V.—*Statistics of Officers.*

Sickness and Mortality among Officers of the British Army in 1911.

	Northern Army.	Southern Army.	India.
STRENGTH	1,161	1,054	2,345
CASES REMAINING FROM 1910	22	16	38
	Ratios	Ratios	Ratios
CONSTANTLY SICK	21·3	22·0	20·6
INVALIDINGS...	1·5	18·0	15·78
ADMISSIONS.			
Influenza	19·8	12·3	15·4
Cholera	·9	...	·4
Small-pox	1·7	...	1·3
Enteric Fever	9·5	3·8	6·4
Malaria	43·1	55·0	46·5
Sandfly Fever	43·1	9·5	25·6
Pyrexia of uncertain origin	31·9	45·5	37·1
Tubercle of the lungs	...	...	...
Pneumonia	2·6	·9	1·7
Respiratory Diseases	18·9	17·1	17·9
Dysentery	10·3	14·2	11·5
Diarrhœa	21·5	21·8	20·5
Hepatic Abscess	·9	...	·4
,, Congestion Inflammation	25·8	11·4	17·9
Venereal Diseases	...	1·9	·9
ALL CAUSES ...	633·9	578·7	582·1
DEATHS.			
Cholera	·86	...	·43
Small-pox	...	...	...
Enteric Fever	·86	...	·43
Malaria	·86	...	·43
Pyrexia of uncertain origin	...	...	...
Heat-Stroke	...	...	...
Circulatory Diseases	...	...	...
Tubercle of the lungs	...	...	...
Pneumonia	1·72	...	·85
Respiratory Diseases	...	...	...
Dysentery	...	...	...
Diarrhœa	...	...	...
Hepatic Abscess...	...	...	...
Deaths not reported in Medical returns	...	...	·85
ALL CAUSES ...	10·34	4·74	8·10*
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES.	...	...	8·53

* Including deaths not reported in medical returns.

TABLE NO. VI.—*Summary, Sickness and*

Groups.	Years.	*Average Strength.	RATIO PER					
			Constantly sick.	Invaliddings.	A.—ADMISSIONS. D.—DEATHS			
					Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1901-1910	1,323	22·9	...	2·1	...	...	...
	1910	1,284	24·1	...	...	...	...	...
	1911	1,298	30·8	...	3·9	...	...	...
„ II.—Burma Inland	1901-1910	3,281	26·5	...	·2	...	·2	·15
	1910	2,865	17·8	...	...	...	...	...
	1911	2,568	23·4	...	...	...	...	...
„ III.—Assam	1901-1910	1,068	31·1	...	1·0	...	·4	·28
	1910	891	22·4	...	9·0	...	...	...
	1911	884	18·1	...	...	...	...	...
„ IV.—Bengal and Orissa	1901-1910	2,248	29·0	...	5·1	...	·2	·31
	1910	2,125	24·9	...	...	...	·5	·47
	1911	2,296	24·0	...	...	...	...	...
„ V.—Gangetic Plain and Chutia Nagpur ...	1901-1910	6,360	20·2	...	2·7	·02	·9	·57
	1910	6,163	20·0	...	2·8	...	...	...
	1911	6,032	18·9	...	3·2	...	...	...
„ VI.—Upper Sub-Himalaya	1901-1910	18,550	22·1	...	2·2	...	·4	·32
	1910	22,509	22·9	...	1·2	...	·0	·04
	1911	21,805	20·1	...	3·9	...	·1	...
„ VII.—North-Western Frontier, Indus Valley and North Western Rajputana.	1901-1910	17,938	28·7	...	5·2	...	·3	·22
	1910	18,738	28·0	...	2·8	...	·5	·27
	1911	19,447	23·7	...	2·9	...	·1	·05
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1901-1910	12,188	24·8	...	2·2	...	·1	·04
	1910	11,320	17·9	...	2·4	...	·3	·09
	1911	11,170	17·3	...	1·6	...	...	...
„ IX.—Deccan	1901-1910	16,648	20·3	...	3·5	·02	·8	·50
	1910	17,645	18·9	...	1·8	...	·1	...
	1911	16,656	18·7	...	·3	...	·4	·30
„ X.—Western Coast	1901-1910	1,850	30·5	...	1·0	...	·1	·05
	1910	1,900	30·0	...	7·9	...	...	...
	1911	1,987	39·8	...	2·0	...	...	...
„ XI.—Southern India	1901-1910	5,623	24·5	...	·9	...	·9	·59
	1910	3,377	26·6	...	...	...	·2	...
	1911	4,898	18·6	...	...	...	·6	·41
„ XII.—Hill Stations	1901-1910	22,111	27·6	...	6·2	·03	·4	·24
	1910	23,650	22·2	...	1·1	...	·0	·04
	1911	22,477	22·7	...	7·5	...	·1	·09
Army of India	1901-1910	1,26,331	23·8	8·7	3·9	·01	·5	·30
	1910	1,31,274	21·1	5·21	1·7	...	·2	·09
	1911	1,31,213	19·8	4·43	3·0	...	·1	·11

* The decennial ratios are worked on the total strength of the 10-year period.

Mortality by Geographical Groups.

MILLE OF STRENGTH.

FROM

FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·2	...	·1	...	164·1	·76	66·4	·15	2·3	·68	56·2	·23	29·2	·08	677·3	5·14
...	...	...	...	1·3	...	131·6	·78	3·9	...	57·6	...	14·8	...	634·0	1·56
...	...	...	...	79·4	...	110·2	...	3·1	1·54	26·2	...	33·9	...	741·9	5·39
·1	...	·4	·06	303·7	1·71	24·2	·09	2·8	·58	28·1	·21	18·0	...	735·1	5·94
·3	...	1·4	·35	113·4	·35	31·8	1·05	1·7	...	22·0	...	9·1	...	443·6	3·84
·8	...	·4	...	228·6	1·17	153·8	·39	3·5	·78	12·1	·39	10·5	...	742·6	7·40
·1	...	1·9	·47	348·9	1·50	3·0	...	7·4	·94	50·7	·75	28·2	...	834·6	6·18
...	...	...	..	131·3	1·12	11·2	...	16·8	...	7·9	1·12	24·7	...	564·5	6·73
...	...	...	...	110·9	...	14·7	...	12·4	1·13	9·0	...	17·0	...	485·3	2·26
·3	...	·4	·18	307·1	1·38	22·7	·13	7·0	1·33	62·2	·44	26·9	·09	752·7	6·27
...	...	·5	...	107·8	...	118·6	...	7·5	2·35	36·2	·47	26·8	...	715·8	5·18
...	...	1·3	...	114·1	·87	88·4	...	5·7	...	27·9	·44	20·5	·44	586·7	3·48
·5	·02	·5	·22	151·8	·99	11·4	·09	8·3	1·64	36·7	·28	17·7	·09	536·5	7·01
...	...	1·5	·49	79·2	·16	36·7	·32	9·9	1·78	21·7	...	22·4	·16	502·7	4·87
...	...	·3	...	55·7	·50	52·4	...	5·5	·33	34·3	·33	19·4	...	513·1	3·48
·6	·03	1·8	·49	212·4	1·01	14·5	·08	13·8	2·51	27·4	·13	18·2	·04	591·5	7·64
1·	0·4	2·0	·58	152·3	·40	32·1	·36	9·6	1·42	24·5	·04	18·7	...	581·5	5·46
·3	...	2·8	·64	69·6	·46	24·3	...	8·5	·87	19·4	·09	14·4	·05	476·0	5·92
9·	0·3	1·6	·28	387·4	1·06	8·3	·04	18·6	3·61	47·1	·18	13·2	·02	900·8	8·40
·3	...	3·6	·64	361·7	·32	18·9	·21	14·9	2·78	36·8	·11	10·4	...	935·8	6·88
4·	...	3·0	·67	166·7	·57	19·9	·05	12·3	2·42	31·7	·05	6·3	...	714·1	5·55
7·	1·0	1·1	·33	301·8	1·14	7·5	·05	13·3	2·41	23·9	·14	26·1	·04	718·0	7·38
4·	...	2·7	·35	139·8	·18	8·2	·27	10·2	1·24	15·6	·18	13·7	...	495·9	5·04
2·	...	4·7	·63	85·0	·18	9·8	...	5·8	·90	18·9	...	13·0	·09	436·0	3·13
8·	0·3	1·3	·22	127·7	·53	21·7	·05	7·1	1·15	28·3	·15	30·1	·05	518·2	6·04
1·	...	2·7	·17	65·2	·11	38·8	...	9·5	1·02	27·3	·17	23·8	·11	440·5	3·80
4·	...	2·4	·36	59·3	·90	34·6	·30	4·9	·42	21·1	·12	21·1	·90	449·7	3·00
6·1	0·5	·9	·54	238·0	1·24	8·4	·05	9·3	2·38	56·3	·65	43·5	·16	762·3	11·52
...	...	2·1	2·11	185·3	1·58	18·9	...	10·0	3·68	62·1	·53	32·1	...	695·3	11·58
5·	...	3·0	·50	315·6	·50	59·9	·50	11·6	4·53	56·9	·50	22·1	...	983·9	11·07
7·	0·7	·4	·05	146·4	·60	23·2	·05	8·7	1·64	26·7	·34	34·4	·07	579·0	8·89
...	...	·9	...	224·5	·37	27·7	·19	5·0	·56	25·1	...	26·8	·19	619·9	3·72
8·	...	8·	...	172·7	·20	21·8	...	6·7	·20	14·1	·20	20·6	...	501·6	3·88
3·	0·5	2·0	·50	241·1	1·28	18·9	·05	15·5	3·03	34·8	·26	21·1	·96	686·8	10·49
1·	...	4·5	·89	131·0	·17	28·3	·08	9·4	1·40	21·5	·04	16·8	...	543·2	5·03
2·	...	2·9	·62	110·0	·69	31·0	·13	8·5	·71	16·8	·09	16·3	...	520·6	4·89
5·	0·3	1·3	·29	238·6	1·02	14·6	·05	12·2	2·26	35·7	·24	21·0	·04	655·3	7·88
2·	1·0	2·5	·44	159·7	·25	28·5	·18	9·4	1·34	26·2	·09	16·9	·03	572·8	4·89
3·	...	2·3	·42	105·0	·42	31·0	·08	7·5	·98	22·6	1·12	14·6	·03	515·8	4·48

INDIAN TROOPS.

TABLE NO. VII.—*Ratios of armies, 1911.*

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.
I.—AVERAGE ANNUAL STRENGTH	62,777	50,146	131,213
II.—CONSTANTLY SICK	22·0	20·4	19·8
III.—INVALIDINGS	...	...	4·43*
IV.—ADMISSION RATE OF THE YEAR—			
Influenza	5·1	·8	3·0
Cholera	·1	·2	·1
Small-pox	·2	·4	·3
Enteric Fever	2·7	2·6	2·3
Malaria	108·5	110·5	105·0
Sandfly Fever	1·8	...	·9
Pyrexia of uncertain origin	29·8	36·6	31·0
Plague	·5	1·3	·7
Tubercle of the lungs	2·8	1·6	2·1
Pneumonia	9·3	6·2	7·5
Respiratory Diseases	33·0	24·6	30·2
Dysentery	25·3	19·3	22·6
Diarrhœa	6·1	8·8	7·2
Hepatic {Abscess	·0	·1	·0
Hepatic {Congestion and Inflammation	·9	·9	·9
Scurvy	·5	1·2	·8
Venereal Diseases	14·1	16·2	14·9
ALL CAUSES ...	571·6	510·5	515·8
V.—DEATH RATE OF THE YEAR—			
Cholera	·03	·16	·11
Small-pox	...	...	...
Enteric Fever	·53	·44	·42
Malaria	·59	·24	·42
Sandfly Fever	...	...	...
Pyrexia of uncertain origin	·03	·18	·08
Plague	·32	·24	·27
Circulatory Diseases	·06	·20	·11
Tubercle of the lungs	·32	·10	·21
Pneumonia	1·23	·82	·98
Respiratory Diseases	·43	·24	·34
Dysentery	·13	·12	·12
Diarrhœa	·02	·04	·02
Hepatic Abscess	·02	·02	·02
Anæmia and Debility	·05	·08	·06
ALL CAUSES ...	5·26	4·17	4·48

*Details not available.

INDIAN TROOPS.

TABLE NO. VIII.—*Ratios of geographical groups, 1911.*

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India.*
I.—AVERAGE ANNUAL STRENGTH.	1,298	2,568	884	2,296	6,032	21,805	19,447	11,170	16,656	1,987	4,898	22,477	131,213
II.—CONTSTANTLY SICK RATE OF THE YEAR.	30·8	23·4	18·1	24·0	18·9	20·1	23·7	17·3	18·7	39·8	18·6	22·7	19·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	3·9	...	...	...	3·2	3·9	2·9	1·6	·3	2·0	...	7·5	3·0
Cholera	...	...	...	...	...	·1	·1	...	·4	...	·6	·1	·1
Small-pox	...	·8	...	...	...	·3	·4	·2	·4	·5	·8	·2	·3
Enteric Fever	...	·4	...	1·3	·3	2·8	3·0	4·7	2·4	3·0	·8	2·9	2·3
Malaria	79·4	228·6	110·9	114·1	55·7	69·6	166·7	85·0	59·3	315·6	172·7	110·0	105·0
Sandfly Fever	...	...	...	...	...	·9	5·4	...	...	...	...	·4	·9
Pyrexia of uncertain origin	110·2	153·8	14·7	88·4	52·4	24·3	19·9	9·8	34·6	59·9	21·8	31·0	31·0
Plague ...	...	1·9	...	...	1·5	·8	·1	4·7	·2	...	1·2	·0	·7
Tubercle of the lungs	...	·4	4·5	2·2	2·7	2·8	2·5	2·1	2·2	1·0	1·2	2·5	2·1
Pneumonia	3·1	3·5	12·4	5·7	5·5	8·5	12·3	5·8	4·9	11·6	6·7	8·5	7·5
Respiratory Diseases	37·8	30·8	39·6	42·7	17·4	32·4	40·6	19·6	19·2	47·3	14·5	32·0	30·2
Dysentery	26·2	12.1	9·0	27·9	34·3	19·4	31·7	18·9	21·1	56·9	14·1	16·8	22·6
Diarrhœa	10·8	11·3	9·0	3·9	8·8	5·2	7·6	3·0	5·5	20·1	4·9	10·4	7·2
Hepatic Abscess	...	...	...	·4	...	·1	...	...	...	...	·2	·1	·0
Hepatic Congestion and Inflammation	3·1	...	...	·9	·7	1·3	·5	1·0	·7	·5	1·4	1·0	·9
Scurvy ...	...	·4	...	·4	·7	·7	·5	·7	·5	14·6	·2	·4	·8
Venereal Diseases ...	33·9	10·5	17·0	20·5	19·4	14·4	6·3	13·0	21·1	22·1	20·6	16·3	14·9
ALL CAUSES	741·9	742·6	485·3	586·7	513·1	476·0	714·1	436·0	449·7	983·9	501·6	520·6	515·8
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	...	...	·05	...	·30	...	·41	·09	·11
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	...	...	...	...	...	·64	·67	·63	·36	·50	...	·62	·42
Malaria	...	1·17	...	·87	·50	·46	·57	·18	·06	·50	·20	·67	·42
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin	...	·39	...	...	...	...	·05	...	·30	·50	...	·13	·08
Plague ...	...	1·95	...	...	1·16	·60	...	·03	·12	...	·61	...	·27
Circulatory Diseases	·77	·39	...	...	...	·05	·10	·09	·24	·50	·20	·09	·11
Tubercle of the lungs	...	...	...	...	...	·46	·15	·18	·06	...	...	·40	·21
Pneumonia	1·54	·78	1·13	...	·33	·87	2·42	·90	·42	4·53	·20	·71	·98
Respiratory Diseases	...	...	...	·44	·17	·64	·31	·27	·06	·50	...	·53	·34
Dysentry	...	·39	...	·44	·33	·09	·05	...	·12	·50	·20	·09	·12
Diarrhœa	...	·39	...	...	...	...	...	...	...	...	...	·09	·02
Hepatic Abscess	...	...	...	...	...	·05	...	...	...	...	...	·04	·02
Anæmia and Debility	·77	·39	...	·44	...	...	·10	...	...	·50	...	...	·06
ALL CAUSES	5·39	7·40	2·26	3·48	3·48	5·92	5·55	3·13	3·00	11·07	3·88	4·89	4·48

* Including Group Extra India and Field Forces.

TABLE NO. IX—PART I.—*Summary*

A.—Administrations.	Years.	Average strength.‡	RATIO PER						
			Constantly sick.	Cholera.		Small-pox.		Malaria.	
				A.	D.	A.	D.	A.	D.
Burma	1901-1910	12,831	18	1·3	·76	·1	·02	69·5	·48
	1910	14,774	15	·4	·27	...	...	45·4	·14
	1911	16,282	15	·1	·06	·7	·06	44·0	·37
Eastern Bengal and Assam	1901-1910	6,733	42	1·5	1·10	·4	·07	275·1	2·32
	1910	7,436	39	1·2	·81	...	...	173·9	2·42
	1911	7,399	42	·4	...	·1	...	198·3	2·97
Bengal	1901-1910	14,768	37	1·7	·96	·8	·09	311·2	1·68
	1910	13,947	36	·6	·22	·4	·07	281·8	1·43
	1911	13,274	34	·4	·30	·2	...	254·6	1·28
United Provinces of Agra and Oudh	1901-1910	25,623	30	·7	·44	·7	·07	224·1	1·03
	1910	25,362	23	·6	·35	·1	...	123·2	·87
	1911	23,932	24	·2	·13	·1	...	94·0	·96
Punjab	1901-1910	11,988	30	·2	·08	·6	·07	212·7	·69
	1910	11,875	29	...	...	·3	...	116·0	·25
	1911	11,910	33	...	...	·3	...	98·2	·76
North-West Frontier Province	1901-1910	1,305	32	·1	...	1·7	·46	485·6	·27
	1910	1,436	26	...	...	1·4	·70	353·1	...
	1911	1,594	21	...	...	·6	...	197·6	...
Central Provinces	1901-1910	4,102	23	·2	·07	·4	·05	237·4	·73
	1910	3,998	21	1·0	·25	·8	...	104·8	·75
	1911	3,576	22	...	...	1·1	...	65·7	·84
Bombay	1901-1910	8,268	29	·6	·25	1·0	·08	179·9	1·32
	1910	8,071	25	...	...	·7	...	96·3	1·61
	1911	8,598	22	...	...	1·4	...	86·8	·70
Madras	1901-1910	10,176	21	5·9	2·59	·3	·02	88·5	·90
	1910	10,559	21	·1	...	·2	...	94·2	·57
	1911	10,050	21	·4	·20	·4	·10	64·2	·60
INDIA†	1901-1910	96,453	29	1·4	·75	·6	·07	217·0	1·10
	1910	98,032	26	·4	·23	·3	·03	134·7	·90
	1911	97,215	26	·2	·10	·4	·03	113·8	·96
ANDAMANS	1901-1910	13,518	72	·0	·01	...	...	1,135·0	3·60
	1910	12,423	90	...	...	...	...	995·1	5·07
	1911	11,884	61	...	...	...	...	680·4	2·02
INDIA§	1901-1910	109,971	34	1·2	·66	·5	·06	329·9	1·41
	1910	110,455	33	·4	·21	·2	·03	231·5	1·37
	1911	109,099	30	·2	·09	·4	·03	175·5	1·07

* Excluding subsidiary jails.

† Including Ajmer, Sibi, Quetta, Mercara and Secunderabad and excluding Andamans.

‡ The decennial ratios are worked on the total strength of the ten year period.

§ Including Andamans.

NERS.

sickness and Mortality, 1911.

MILLE OF STRENGTH.

A.—Admissions from.

D.—Deaths from

Tubercle of the lungs.		Pneumonia.		Respiratory Diseases.		Dysentery.		Diarrhœa.		Anæmia and debility.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
7·6	3·59	4·0	1·11	11·6	·48	31·5	1·98	19·2	·52	3·7	·23	362·3	15·05
6·8	2·91	2·9	·81	18·6	·61	14·3	1·29	10·2	...	2·8	·14	309·1	11·98
6·9	3·56	3·3	·68	9·1	·25	15·0	1·41	8·6	·12	4·1	·06	307·3	12·28
10·5	3·88	10·6	3·48	34·4	1·14	252·0	7·78	75·9	·95	22·8	1·31	979·9	29·67
13·0	6·45	13·0	4·03	31·2	1·88	202·4	7·93	45·2	·94	19·9	1·88	793·0	34·10
12·2	5·00	14·2	4·19	32·3	1·49	223·7	9·06	68·7	·95	18·8	1·49	905·0	33·65
11·7	3·94	10·0	2·53	30·2	·60	175·1	5·67	88·4	1·14	10·6	·62	951·2	23·61
7·5	3·30	8·4	2·22	32·9	·57	99·2	3·59	110·5	·57	12·2	·50	876·0	18·36
9·0	2·64	8·1	1·73	34·4	·60	100·4	3·62	122·8	·75	15·6	·98	836·6	17·85
7·8	2·79	14·0	3·25	23·1	·97	41·7	3·27	26·2	1·16	11·8	·26	642·4	18·99
6·3	2·37	14·2	2·96	21·5	·83	25·8	1·85	23·0	1·22	5·7	·28	461·7	15·65
7·4	2·86	11·4	2·05	22·2	·75	32·1	2·13	19·4	1·17	5·1	·17	442·6	14·62
10·6	4·39	19·1	4·35	38·0	·75	48·5	2·74	53·4	1·07	21·0	·72	825·3	22·13
18·3	6·57	22·2	4·38	43·3	1·52	46·6	3·87	37·4	1·18	20·7	1·09	575·7	28·63
24·9	7·22	20·2	4·62	55·3	·84	39·5	2·02	42·1	1·26	26·1	1·01	631·0	27·04
5·7	1·53	20·0	4·37	33·1	1·00	73·7	3·06	42·1	·46	14·8	·38	1,083·7	20·53
7·0	2·79	15·3	3·48	44·6	2·09	71·0	1·39	37·6	·70	9·1	·70	870·5	23·68
2·5	...	16·9	3·14	25·7	...	32·0	...	16·3	·63	6·3	...	670 0	11·29
6·0	2·73	8·5	1·88	20·8	1·29	51·2	4·95	42·1	1·22	15·0	·83	677·7	21·01
10·3	4·75	5·5	1·75	17·5	2·00	87·3	16·26	32·5	1·00	11·0	·50	499·7	36·52
13·4	6·15	7·8	2·80	13·4	1·12	95·9	11·47	18·5	·28	12·0	·84	524·0	31·32
5·6	2·73	19·3	5·21	35·1	1·32	46·6	1·64	39·7	1·34	11·8	·79	653·5	22·62
3·1	·99	11·6	2·73	26·6	·62	43·9	·99	29·0	1·49	19·1	·62	511·0	14·62
3·7	1·98	11·6	4·42	39·3	1·51	31·1	1·40	34·1	1·05	9·0	·58	429·5	18·73
10·0	3·21	8·0	1·87	23·1	·56	58·3	3·64	6·5	·09	9·2	·50	458·8	20·54
9·4	2·65	5·6	1·61	23·4	·28	49·1	3·88	11·6	...	10·2	·09	451·1	15·25
13·1	3·18	4·4	·70	26·2	·60	33·5	1·69	10·9	·30	6·3	·30	415·6	13·83
8·8	3·35	11·1	3·02	26·4	·82	79·2	3·68	41·5	·95	12·4	·55	688·1	20·92
8·7	3·41	11·0	2·57	26·8	·91	57·7	3·46	36·9	·80	11·0	·53	549·4	19·29
10·5	3·65	10·2	2·37	28·3	·76	56·6	2·91	38·6	·78	10·8	·53	537·7	18·44
11·3	7·13	13·5	4·81	62·8	1·18	134·2	8·20	47·2	1·04	·4	·01	1,793·0	34·33
14·7	8·53	15·2	7·08	57·9	·72	98·3	7·41	25·1	·24	...	...	1,566·3	40·01
5·8	5·22	8·5·0	4·71	67·8	·59	93·8	3·70	50·5	·84	·2	...	1,249·8	24·40
9·1	3·82	12·3	3·24	30·8	·86	86·0	4·23	42·2	·96	10·6	·48	823·9	22·57
9·4	3·98	11·9	3·08	30·3	·89	82·3	3·90	33·6	·73	9·7	·47	663·8	21·62
9·9	3·82	10·7	2·62	32·6	·74	69·7	3·00	39·9	·79	9·6	·48	615·2	19·09

TABLE NO. IX—PART II.—*Summary*

B.—Groups.	Years.	Average strength.‡	Constantly sick.	RATIO PER MILLE A.—ADMISSIONS D.—DEATHS Influenza. A.	Influenza. D.	Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.
Group I.—Burma Coast and Bay Islands	1901-1910	14,069	33	3·4	·02	·5	·27	·1	·02
	1910	10,361	15	11·1	...	·3	·19	...	...
	1911	11,314	15	·5	...	·1	...	1·1	·09
„ II.—Burma Inland	1901-1910	3,972	19	2·0	...	2·3	1·49	·1	...
	1910	4,413	13	...	...	·7	·45	...	...
	1911	4,968	14	...	...	·2	·20	...	...
„ III.—Assam	1901-1910	1,375	36	20·2	...	1·8	1·67	·7	·07
	1910	1,630	31	8·0	...	1·9	1·23	...	...
	1911	1,675	47	...	...	·6	...	...	...
„ IV.—Bengal and Orissa	1901-1910	12,550	41	14·5	·33	1·6	·92	·6	·08
	1910	13,207	40	·2	...	·7	·38	·3	...
	1911	12,678	38	·6	·08	·4	·16	·2	...
V.—Gangetic Plain and Chutia Nagpur ...	1901-1910	23,859	30	8·7	·07	1·2	·70	·9	·07
	1910	22,317	25	·5	...	·8	·44	·2	·04
	1911	21,203	26	1·3	...	·3	·24	·1	...
„ VI.—Upper Sub-Himalaya	1901-1910	12,827	31	12·1	·16	·1	·08	·5	·10
	1910	12,637	25	1·5	...	...	...	·2	...
	1911	12,745	27	1·0	...	·1	...	·2	...
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1901-1910	8,210	29	6·0	·12	·2	·06	1·2	·16
	1910	8,763	29	·6	...	...	...	·9	·23
	1911	9,101	30	·4	...	...	...	·9	·11
„ VIII.—South-Western Rajputana, Central India and Gujarat.	1901-1910	4,592	35	7·8	·02	·3	·24	·6	·02
	1910	4,297	29	...	...	...	...	·2	...
	1911	4,197	23	4·1	...	...	...	1·4	...
„ IX.—Deccan	1901-1910	7,802	30	9·3	·06	·3	·18	·3	·04
	1910	7,482	27	3·7	...	·7	·27	·4	...
	1911	7,236	24	2·1	...	...	...	·6	...
„ X.—Western Coast	1901-1910	2,553	23	·8	...	1·5	·59	·8	·08
	1910	2,363	21	...	...	...	...	·8	...
	1911	2,329	22	...	...	...	...	1·3	·42
„ XI.—Southern India	1901-1910	9,194	21	2·3	·01	6·0	2·53	·3	·02
	1910	9,638	21	...	...	·1	...	·2	...
	1911	9,170	21	...	...	·4	·22	·2	...
„ XII.—Hills	1901-1910	596	28	2·5	...	7·4	5·20	·8	...
	1910	565	27	...	...	...	...	...	...
	1911	540	24	...	...	...	...	...	...
INDIA†	1901-1910	96,453	29	8·2	·09	1·4	·75	·6	·07
	1910	98,032	26	2·0	...	·5	·23	·3	·03
	1911	97,215	26	·9	·01	·2	·10	·4	·03
ANDAMANS	1901-1910	13,518	72	6·4	·01	·0	·01	...	...
	1910	12,423	90	·1	...	...	...	...	...
	1911	11,884	62	...	...	...	...	...	...
INDIA§	1901-1910	109,971	34	7·9	·08	1·2	·66	·5	·06
	1910	110,455	33	1·8	...	·4	·21	·2	·03
	1911	109,099	30	·8	·01	·2	·09	·4	·03

† Including Aden and excluding Andamans.
‡ The decennial ratios are worked on the total strength of the ten year period.
§ Including Andamans.

ERS.

sickness and Mortality, 1911.

OF STRENGTH.*

FROM

FROM

Enteric Fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhœa.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
·4	·14	444·8	1·68	12·5	...	6·3	2·03	72·5	4·76	41·9	·86	899·7	21·90
1·6	·58	56·8	·10	27·5	...	2·9	·58	12·3	1·16	12·0	...	346·4	11·77
2·3	·44	55·9	·27	38·6	...	3·3	·44	14·8	1·59	10·7	·18	342·0	13·08
·8	·33	72·4	·53	8·8	...	6·1	1·74	48·1	2·95	25·8	1·08	372·7	18·00
...	...	18·4	·23	17·7	...	2·9	1·36	19·3	1·59	5·9	...	221·4	12·46
2·6	·20	16·7	·60	22·1	·20	3·2	1·21	15·7	1·01	3·8	...	228·5	10·47
·8	·29	339·1	3·64	2·2	...	7·5	2·47	176·1	9·38	77·7	1·16	893·0	32·88
4·9	1·84	227·6	2·45	·6	...	13·5	3·07	134·4	4·29	66·9	1·84	766·3	31·90
·6	...	199·3	4·77	1·8	...	26·8	7·76	237·5	17·30	90·1	2·98	1,008·9	61·46
·9	·26	299·9	1·86	7·8	·02	10·8	3·12	221·0	6·44	81·7	1·00	969·3	25·81
·8	·23	265·8	1·59	8·2	...	9·4	3·10	141·2	4·85	88·5	·45	877·0	22·56
·4	·24	253·4	1·34	1·5	·08	10·1	2·60	162·3	5·44	105·3	·47	905·6	20·11
·5	·13	218·6	1·24	6·2	·01	10·6	2·38	80·4	4·06	44·0	1·15	694·6	20·24
·4	·13	123·9	1·15	3·6	·04	9·2	1·90	52·5	3·14	37·1	1·11	509·0	17·64
·8	·24	113·5	1·37	4·4	·05	7·8	1·27	49·4	2·55	44·0	1·46	498·6	16·60
·7	·19	351·6	·82	4·5	·01	20·0	4·89	49·2	3·06	43·6	1·32	837·5	20·62
...	...	157·6	·47	2·8	...	21·0	4·75	27·4	1·82	31·4	1·35	548·4	20·97
·2	·16	119·3	·94	6·8	·08	18·9	4·63	27·0	1·65	34·5	1·10	555·8	21·42
·4	·12	248·8	1·08	1·9	·02	25·4	6·59	49·6	2·70	42·3	·74	721·1	24·35
1·0	·23	129·2	1·48	1·3	...	22·0	4·91	63·9	4·45	30·8	·68	580·1	28·07
·3	·11	109·1	·33	5·7	·11	20·7	5·38	42·7	1·65	23·4	·55	592·2	23·29
·2	·11	224·8	·72	·7	·07	19·5	4·57	29·6	1·87	32·0	1·00	674·7	20·05
·2	·23	136·1	·47	4·2	·23	17·5	3·72	17·0	·23	56·1	2·09	606·0	16·52
...	...	83·9	·95	·2	...	12·2	2·38	14·5	1·43	20·5	·48	443·7	12·87
·4	·13	238·4	·78	4·7	...	7·6	1·73	51·5	3·20	44·8	1·14	757·4	17·60
·8	·27	125·2	·53	9·3	...	5·2	1·60	74·3	9·49	31·7	·80	607·2	24·19
·7	·14	98·1	·83	11·9	...	6·8	2·07	70·1	6·08	29·9	·55	546·4	22·39
5·4	1·21	128·1	1·80	11·9	·08	9·0	2·39	55·2	2·59	35·0	1·65	517·4	26·44
5·9	·85	64·3	1·69	18·2	·83	9·7	2·54	63·9	2·12	48·7	2·12	499·4	25·39
2·6	·43	49·8	...	4·3	...	8·2	2·58	34·8	2·58	48·9	1·72	416·5	20·61
1·0	·20	89·5	·73	23·7	...	7·9	1·93	57·5	3·60	5·3	·09	459·7	19·77
1·2	·10	95·0	·42	23·9	...	5·1	1·35	45·3	3·74	5·4	...	422·0	13·38
·9	·22	66·1	·65	14·9	...	4·1	·55	35·9	1·74	10·6	·33	413·0	13·85
2·5	1·34	259·2	3·02	12·1	...	21·0	5·53	87·9	8·22	59·0	3·19	867·8	39·06
1·8	...	249·6	3·54	1·8	...	17·7	1·77	90·3	5·31	61·9	1·77	950·4	23·01
...	...	172·2	3·70	7·4	...	18·5	3·70	77·8	...	61·1	...	874·1	12·96
·8	·21	217·0	1·10	8·6	·01	12·1	3·02	79·2	3·68	41·5	·95	688·1	20·92
·9	·23	134·7	·90	9·8	·03	11·0	2·57	57·7	3·46	36·9	·80	549·4	19·29
·9	·22	113·8	·96	11·0	·05	10·2	2·37	56·6	2·91	38·6	·78	537·7	18·44
·1	·01	1,135·0	3·60	9·2	·01	13·5	4·81	134·2	8·20	47·2	1·04	1,793·0	34·33
·1	·08	995·1	5·07	·3	·08	19·2	7·08	98·3	7·41	25·1	·24	1,566·3	40·01
·2	·17	680·4	2·02	·1	...	15·0	4·71	93·8	3·70	50·5	·84	1,249·8	24·40
·7	·19	329·9	1·41	8·7	·01	12·3	3·24	86·0	4·23	42·2	·96	823·9	22·57
·8	·22	231·5	1·37	8·8	·05	11·9	3·08	62·3	3·90	35·6	·73	663·8	21·62
·8	·21	175·5	1·07	9·5	·05	10·7	2·62	60·7	3·00	39·9	·79	615·2	19·09

* Excluding subsidiary jails.

PRISONERS.

TABLE NO. X.—*Ratios of administrations, 1911.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.											
	Burma.	Eastern Bengal and Assam.	Bengal.	United Provinces.	Punjab.	N.-W.F. Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH ...	16,282	7,399	13,274	23,932	11,910	1,594	3,576	8,598	10,050	97,215	11,884	109,099
II.—CONSTANTLY SICK RATE OF THE YEAR ...	14·7	41·5	34·3	24·3	33·2	20·7	21·5	21·6	20·7	25·7	62·0	29·7
III.—ADMISSION RATE OF THE YEAR—												
Influenza	·4	·9	·2	1·6	·3	...	4·2	...	...	·9	...	·8
Cholera	·1	·4	·4	·2	...	...	...	...	·4	·2	...	·2
Small-pox	·7	·1	·2	·1	·3	·6	1·1	1·4	·4	·4	...	·4
Enteric Fever	2·4	·4	·8	·5	·3	...	...	·9	1·2	·9	·2	·8
Malaria	44·0	198·3	254·6	94·0	98·2	197·6	65·7	86·8	64·2	113·8	680·4	175·5
Pyrexia of uncertain origin	33·6	1·1	2·0	4·7	7·0	18·8	9·2	5·6	14·4	11·0	·1	9·5
Tubercle of the lungs	6·9	12·2	9·0	7·4	24·9	2·5	13·4	3·7	13·1	10·5	5·8	9·9
Pneumonia	3·3	14·2	8·1	11·4	20·2	16·9	7·8	11·6	4·4	10·2	15·0	10·7
Respiratory Diseases	9·1	32·3	34·4	22·2	55·8	25·7	13·4	39·3	26·2	28·3	67·8	32·6
Dysentery	15·0	223·7	100·4	32·1	39·5	32·0	95·9	31·1	33·5	56·6	93·8	60·7
Diarrhœa	8·6	68·7	122·8	19·4	42·1	16·3	18·5	34·1	10·9	38·6	50·5	39·9
Spleen Diseases	·2	...	·3	·5	1·7	·6	...	·6	...	·5	1·5	·6
Scurvy	·3	8·1	·5	·0	·4	·6	·3	4·0	·1	1·2	1·9	1·3
Anæmia and Debility	4·1	18·8	15·6	5·1	26·1	6·3	12·0	9·0	6·3	10·8	·2	9·6
Abscess, Ulcer, and Boil	31·8	48·8	56·0	83·9	102·3	143·0	51·7	34·3	36·8	61·6	32·6	58·5
ALL CAUSES ...	307·3	905·0	836·6	442·6	631·0	670·0	524·0	429·5	415·6	537·7	1,249·8	615·2
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	892·1	835·5	...	628·8	689·1	523·6	448·3	454·3	542·3	...	615·9
IV.—DEATH RATE OF THE YEAR—												
Cholera	·06	...	·30	·13	...	...	...	...	·20	·10	...	·09
Small-pox	·06	...	...	...	...	...	...	...	·10	·03	...	·03
Enteric Fever	·37	·13	·38	·13	·17	...	...	·12	·30	·22	·17	·21
Malaria	·37	2·97	1·28	·96	·76	...	·84	·70	·60	·96	2·02	1·07
Pyrexia of uncertain origin ...	·06	·13	...	·04	·08	·63	...	...	...	·05	...	·05
Tubercle of the lungs	3·56	5·00	2·64	2·80	7·22	...	6·15	1·93	3·18	3·65	5·22	3·82
Pneumonia	·68	4·19	1·73	2·05	4·62	3·14	2·80	4·42	·70	2·37	4·71	2·62
Respiratory Diseases	·25	1·49	·60	·75	·84	...	1·12	1·51	·60	·76	·59	·74
Dysentery	1·41	9·06	3·62	2·13	2·02	...	11·47	1·40	1·69	2·91	3·70	3·00
Diarrhœa	·12	·95	·75	1·17	1·26	·63	·28	1·05	·30	·78	·84	·70
Hepatic Abscess	·12	...	...	...	·08	·63	...	·12	...	·05	...	·05
Anæmia and Debility	·06	1·49	·98	·17	1·01	...	·84	·58	·30	·53	...	·48
Phagedæna, Slough and Gangrene ...	...	...	·08	...	·08	...	...	·12	...	·03	·34	·06
ALL CAUSES ...	12·28	33·65	17·85	14·62	27·04	11·29	31·32	18·73	13·83	18·44	24·40	19·09
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	31·71	17·91	...	26·46	10·80	31·29	18·65	13·48	18·27	...	18·90

* Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and excluding Andamans.
† Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and Andamans.

PRISONERS.

TABLE NO. XI.—*Ratios of Geographical Groups, 1911.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH	11,314	4,968	1,676	12,678	21,203	12,745	9,101	4,197	7,236	2,329	9,170	540	97,215
II.—CONSTANTLY SICK RATE OF THE YEAR.	15·1	13·9	46·5	38·2	26·2	27·4	30·1	22·9	23·9	21·5	20·6	24·1	29·7
III.—ADMISSION RATE OF THE YEAR—													
Influenza	·5	...	...	·6	1·3	1·0	·4	4·1	2·1	...	...	...	·9
Cholera	·1	·2	·6	·4	·3	·1	...	...	...	...	·4	...	·2
Small-pox	1·1	...	...	·2	·1	·2	·9	1·4	·6	1·3	·2	...	·4
Enteric Fever	2·3	2·6	·6	·4	·8	·2	·3	...	·7	2·6	·9	...	·9
Malaria	55·9	16·7	199·3	253·4	113·5	119·3	109·1	83·9	98·1	49·8	66·1	172·2	113·8
Pyrexia of uncertain origin	38·6	22·1	1·8	1·5	4·4	6·8	5·7	·2	11·9	4·3	14·9	7·4	11·0
Tubercle of the lungs	7·7	5·2	8·9	11·9	7·3	11·8	21·2	7·1	8·4	18·9	10·8	14·8	10·5
Pneumonia	3·3	3·2	26·8	10·1	7·8	18·9	20·7	12·2	6·8	8·2	4·1	18·5	10·2
Respiratory Diseases	10·2	6·6	32·8	34·6	23·9	31·8	57·8	26·0	29·7	26·6	28·0	44·4	28·3
Dysentery	14·8	15·7	237·5	162·3	49·4	27·0	42·7	14·5	70·1	34·8	35·9	77·8	56·6
Diarrhœa	10·7	3·8	90·1	105·3	44·0	34·5	23·4	20·5	29·9	48·9	10·6	61·1	38·6
Spleen Diseases	...	·6	...	...	·3	2·0	·8	·2	·3	...	...	...	·5
Scurvy	·3	·4	35·2	·4	·2	·2	4·2	...	·1	...	·1	...	1·2
Anæmia and Debility	3·8	4·8	19·7	16·2	8·6	13·3	21·5	10·7	10·2	6·4	5·8	16·7	10·8
Abscess, Ulcer, and Boil	36·5	21·1	48·3	55·5	69·8	100·0	87·2	82·4	45·7	46·4	34·1	81·5	61·6
ALL CAUSES	342·0	228·5	1,008·9	905·6	498·6	555·8	592·2	443·7	546·4	416·5	413·0	874·1	537·7
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	·20	...	·16	·24	...	...	...	...	...	·22	...	·10
Small-pox	·09	...	...	...	...	...	·11	...	...	·43	...	...	·03
Enteric Fever	·44	·20	...	·24	·24	·16	·11	...	·14	·43	·22	...	·22
Malaria	·27	·60	4·77	1·34	1·37	·94	·33	·95	·83	...	·65	3·70	·96
Pyrexia of uncertain origin	...	·20	...	·08	·05	·98	·11	...	...	...	...	...	·05
Tubercle of the lungs	4·07	2·42	5·97	3·79	2·26	4·47	5·16	3·81	3·87	5·58	3·05	3·70	3·65
Pneumonia	·44	1·21	7·76	2·60	1·27	4·63	5·38	2·38	2·07	2·58	·55	3·70	2·37
Respiratory Diseases	·27	·20	2·98	·87	·94	·63	·88	·24	1·24	·86	·65	...	·76
Dysentery	1·59	1·01	17·30	5·44	2·55	1·65	1·65	1·43	6·08	2·58	1·74	...	2·91
Diarrhœa	·18	...	2·98	·47	1·46	1·10	·55	·48	·55	1·72	·33	...	·78
Hepatic Abscess	·18	...	...	...	...	...	·22	...	...	·43	...	...	·05
Anæmia and Debility	·09	...	3·58	·71	·47	·94	·55	...	·83	...	·33	...	·53
Phagedæna, Slough, and Gangrene	...	...	...	...	·05	...	·11	...	...	·43	...	...	·03
ALL CAUSES	13·08	10·47	61·46	20·11	16·60	21·42	23·29	12·87	22·39	20·61	13·85	12·96	18·44

* Including Aden.

General Population.

Table XII.—Provincial Birth and Death Statistics—1911.

Province.	Year.	Births.			Number of Deaths.			Ratio of deaths per 1,000 of population.			Highest Death-rate.		Lowest Death-rate.		Mean death rate during previous five years.			Number of deaths of males to every 100 deaths of females.
		Total number.	Ratio per 1,000 of population	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Bengal	1910	2,007,222	39·72	37·59	96,423	1,582,217	1,672,640	27·99	33·45	33·10	62·82	51·23	7·35	20·13	34·20	36·32	36·19	108
	1911	2,099,572	40·01	36·33	93,902	1,621,517	1,715,419	26·91	33·10	32·69	97·35	51·92	3·28	20·90	29·36	34·22	33·90	107
Eastern Bengal and Assam	1910	1,131,924	37·96	39·07	14,770	990,226	1,004,996	23·23	33·93	33·71	62·23	43·07	7·40	24·11	23·83	32·31	32 13	108
	1911	1,149,492	34·59	34·80	13,775	8,39,703	853,478	18·82	35·83	25·68	38·40	39·01	1·77	19·30	20·10	28 77	28·58	109
United Provinces of Agra and Oudh.	1910	1,955,424	41·00	38·68	135,209	1,708,969	1,844,178	40·17	38·38	38·67	75·84	59·23	15·00	2·23	48·94	42·89	43·32	109·40
	1911	2,053,324	43·84	38·63	174,206	1,931,086	2,105,292	56·04	44·16	44·95	185·15	60·46	28·82	24·57	46·41	41·95	42·25	105·77
Punjab	1910	859,432	42·7	41·1	67,597	601,642	663,239	34·42	33·16	33·28	92·67	55·87	1·87	20·42	47·83	45·40	45·64	106·4
	1911	865,775	43·9	41·6	76,902	595,017	671,919	39·74	33·43	34·05	113·49	53·66	3·68	19·10	45·36	43·41	43·61	106·1
North-West Frontier Province	1910	72,785	38·1	36·3	4,728	46,513	51,241	25·71	26·97	26·85	44·48	31·25	7·27	24·72	31·91	32·34	32·13	115·0
	1911	71,606	35·1	34·2	4,782	42,776	47,558	25·00	23·12	23·30	34·25	25·76	6·54	21·79	29·90	29·95	30·35	115·4
Central Provinces and Berar	1910	663,400	55·42	52·33	54,187	483,065	537,252	43·57	45·03	44·88	93·31	60·28	20·87	35·36	...	...	38·56	109·73
	1911	688,432	49·47	52·68	51,285	431,212	482,497	44·94	33·75	34·67	137·35	52·10	19·27	27·55	42·85	39·83	40·14	111·81
Madras Presidency	1910	1,235,169	33 6	31·8	123,219	784,203	907,422	28·9	24·1	24·7	86·1	34·5	3·3	18·1	30·0	23·4	24·2	103·7
	1911	1,226,488	30·4	32·2	136,267	797,243	933,510	28·2	22·4	23·1	68·5	35·5	1·0	13·8	29·9	24·2	24·9	104·2
Coorg	1910	4,638	25·68	25·40	790	6,032	6,822	51·80	36·48	37·77	72·78	44·09	25·87	29·62	41·85	29·73	30·75	120·56
	1911	4,768	27·25	25·40	488	5,207	5,695	48·89	31·56	32·55	60·08	44·23	42·27	21·06	53·50	32·95	34·12	127·71
Bombay Presidency	1910	689,701	37·32	34·25	94,690	465,313	560,003	35·69	29·03	30·30	58·63	44·67	3·89	14·52	42·37	28·83	30·85	107·94
	1911	705,090	36·00	35·10	100,969	454,343	555,312	36·89	26·96	28·35	125·99	70·54	8·26	11·02	39·99	28·74	30·54	107·47
Lower Burma	1910	197,246	35·46	33·73	26,823	123,286	150,109	37·87	25·40	26·99	63·17	36·45	21·79	19·36	41·13	24·88	25·92	126
	1911	200,947	31·44	33·96	29,094	124,218	153,312	36·35	22·22	23·99	55·34	28·37	12·50	16·29	41·03	25·36	27·35	124
Upper Burma	1910	110,701	37·13	...	12,891	77,359	90,250	39·09	29·17	30·27	63·77	36·73	15·97	21·03	42·60	25·84	27·66	101
	1911	121,509	34·85	...	14,825	79,545	94,370	50·16	24·93	27·07	62·86	36·11	20·54	19·29	42·99	27·51	29·22	101
Ajmer-Merwara	1910	20,355	42·68	35·54	5,991	17,891	23,882	46·22	51·52	50·08	87·47	74·36	25·03	28·15	52·17	31·91	37·41	100·94
	1911	22,700	47·60	36·61	5,649	15,533	21,182	43·57	44·72	44·41	60·74	57·48	31·74	34·48	51·23	36·60	40·48	110·08

TABLE NO. XIII.—*Births.—1911.*

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Bengal	52,468,818	53·45	21·77	40·01	104	7·32	...
Eastern Bengal and Assam ...	33,229,865	43·32	26·54	34·59	106	8·91	...
United Provinces of Agra and Oudh.	46,835,108	57·51	25·44	43·84	108·44	...	1·11
Punjab	19,731,722	51·3	20·0	43·9	109·4	9·8	...
North-West Frontier Province ...	2,041,077	38·1	31·5	35·1	122·5	11·8	...
Central Provinces and Berar ...	13,916,308	54·63	44·59	49·47	104·79	14·80	...
Madras Presidency	40,347,357	38·1	21·0	30·4	104·7	7·3	...
Coorg	174,976	39·00	20·13	27·25	103·41	...	5·30
Bombay Presidency	19,587,383	52·29	16·03	36·00	107·74	7·65	...
Burma... Lower	6,391,845	39·35	18·31	31·44	106	7	...
Burma... Upper	3,486,748	39·83	28·24	34·85	104	8	...
Ajmer-Merwara	*476,912	58·11	44·47	47·60	111·83	3·18	...

* According to Census of 1901.

TABLE NO. XIV.—*Deaths.—1911.*

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of Deaths per 1,000 of population.			Death rate by sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Bengal	52,468,818	111,447	470	49·18	20·90	32·69	33·92	31·46
Eastern Bengal and Assam	33,229,865	74,501	446	38·78	19·26	25·68	26·16	25·17
United Provinces of Agra and Oudh.	46,835,108	106,402	440	60·05	27·47	44·95	44·22	45·74
Punjab	19,731,722	97,213	203	55·2	19·2	34·1	32·0	36·6
North-West Frontier Province.	2,041,077	13,418	152	25·9	21·8	23·3	23·6	23·0
Central Provinces and Berar.	13,916,308	99,803	139	52·63	27·87	34·67	36·75	32·61
Madras Presidency ...	40,347,357	129,870	311	42·3	14·2	23·1	24·0	22·3
Coorg	174,976	1,583	111	44·23	23·21	32·55	32·83	32·19
Bombay Presidency ...	19,587,383	122,978	159	68·07	11·43	28·35	28·23	28·48
Burma Lower ...	6,391,845	75,952	84	38·31	17·03	23·99	25·13	22·71
Burma Upper ...	3,486,748	32,885	106	46·42	20·37	27·07	28·28	25·94
Ajmer-Merwara ...	476,912	2,711	176	45·29	41·45	44·41	44·21	44·64

TABLE NO. XV.—*Deaths in Towns and Rural Circles compared.—1911.*

Province.	Number of Registration Circles.			Population.			Ratio of deaths per 1,000 of population.		
	Rural.	Town.	Total	Rural.	Town.	Total.	Rural.	Town.	Total.
Bengal ...	415	131	546	48,980,618	3,488,200	52,468,818	33·10	26·91	32·69
Eastern Bengal and Assam.	265	54.	319	32,498,016	731,849	33,229,865	25·83	18·82	25·68
United Provinces of Agra and Oudh.	1,081	95	1,176	43,726,543	3,108,565	46,835,108	44·16	56·04	44·95
Punjab	408	130	538	17,796,718	1,935,004	19,731,722	33·43	39·74	34·05
North-West Frontier Province.	65	13	78	1,849,832	191,245	2,041,077	23·12	25·00	23·30
Central Provinces and Berar.	361	107	468	12,775,178	1,141,130	13,916,308	33·75	44·94	34·67
Madras Presidency...	231	269	500	35,516,696	4,830,661	40,347,357	22·4	28·2	23·1
Coorg	5	2	7	164,995	9,981	174,976	31·56	48·89	32·55
Bombay Presidency	228	65	293	16,850,573	2,736,810	19,587,383	26·96	36·89	28·35
Burma {Lower ...	223	41	264	5,591,470	800,375	6,391,845	22·22	36·35	23·99
Burma {Upper ...	120	18	138	3,191,172	295,576	3,486,748	24·93	50·16	27·07
Ajmer-Merwara ...	17	6	23	347,280	129,632	476,912	44·72	43·57	44·41

TABLE NO. XVI.—*Deaths according to age.—1911.*

Province.	Ratio per 1,000 of Population.																			
	Under one year.*		1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Bengal ...	198·77	180·30*	54·53	49·76	19·57	17·35	14·40	13·42	15·44	15·69	17·74	17·63	20·08	18·98	26·05	21·53	41·39	36·22	82·05	67·99
Eastern Bengal and Assam.	197·88	179·34	34·65	30·18	13·44	10·58	9·90	9·27	13·31	16·58	13·80	17·44	16·35	18·60	21·51	20·71	34·30	32·62	61·69	52·33
United Provinces of Agra and Oudh.	254·22	237·31	71·33	70·79	22·30	24·04	17·97	21·85	20·12	25·75	23·09	26·71	27·11	28·53	36·79	35·78	57·36	52·59	94·58	84·81
Punjab ...	194·23	191·87	46·51	47·25	14·18	17·72	13·93	21·56	16·05	21·99	15·73	19·56	18·68	23·39	25·33	27·44	34·98	37·83	71·87	78·91
North-West Frontier Province.	174·97	167·14	41·5	36·2	9·0	9·5	6·6	8·6	7·8	9·4	11·3	11·9	13·3	15·7	18·0	18·1	26·3	26·3	53·1	50·2
Central Provinces and Berar.	262·17	228·53	64·00	54·56	13·81	12·74	9·23	9·95	13·57	13·95	12·93	12·98	15·04	13·73	21·55	16·83	34·91	29·28	68·70	56·41
Madras Presidency.	191·82	174·61	31·4	29·7	9·8	9·3	6·9	6·9	9·6	11·7	10·9	11·6	13·9	12·4	18·9	14·6	29·8	24·6	70·2	68·6
Coorg ...	254·95	229·95	41·69	38·71	13·99	11·24	10·66	9·98	16·79	15·91	20·37	24·52	30·29	27·44	35·22	33·91	55·27	46·83	87·36	72·08
Bombay Presidency.	172·16	159·01	44·73	42·41	13·15	14·94	11·61	15·80	13·70	16·60	14·89	16·63	17·43	17·26	23·71	19·09	37·13	30·82	76·06	72·85
Burma {Lower	231·09	187·21	...	64·70	12·18	10·64	8·60	7·88	12·97	11·21	14·02	...	...	13·83	22·96	...	...	19·47	60·46	59·50
Burma {Upper	261·37	221·43	...	79·90	11·62	10·46	7·55	6·39	10·00	8·44	12·07	...	...	13·33	20·80	...	...	17·82	68·59	66·15
Ajmer-Merwara.	274·45	289·94	192·26	192·87	17·39	15·61	7·17	7·09	11·93	16·87	17·06	20·34	21·50	20·94	30·42	12·98	53·00	44·40	88·62	61·03
Total ...	213·97	196·00	50·36	44·55	15·94	15·36	12·43	13·60	14·74	17·03	15·70	18·56	19·97	18·52	25·13	23·90	41·45	33·61	76·42	70·31

* Rations calculated on the number of births durfng 1911.

NOTE.—The total ratios under the age periods "1—5" to "60 years and upwards" exclude Ajmer-Merwara for which the age distribution of the population is not known.

TABLE XVII.—*Deaths according to cause, 1911.*

Province.	Deaths per 1,000 of Population in 1911.								All causes.	Ratio of deaths in 1910.	Ratio of deaths in 1909.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Bengal	2·37	·09	1·44	20·60	·83	·29	·49	6·54	32·69	33·10	30·55
Eastern Bengal and Assam	1·18	·25	·0008	18·82	·69	·14	·32	4·24	25·68	33·71	33·89
United Provinces of Agra and Oudh	2·51	·03	7·09	27·94	·51	·53	·52	5·81	44·95	38·67	37·34
Punjab	0·06	0·25	8·89	15·33	0·59	2·30	0·34	6·29	34·05	33·28	30·89
North-West Frontier Province	0·01	0·47	0·12	17·48	0·13	0·69	0·37	4·04	23·30	26·85	26·57
Central Provinces and Berar	·22	·12	2·01	16·85	3·15	2·61	·45	9·26	34·67	44·88	33·09
Madras Presidency	1·4	0·6	0·4	7·4	1·6	0·9	0·3	10·5	23·1	24·7	21·8
Coorg	·03	1·70	·33	26·03	·66	·38	·21	3·21	32·55	37·77	28·15
Bombay Presidency	·30	·24	5·13	11·38	1·61	2·63	·38	6·68	28·35	30·30	27·38
Burma { Lower	·41	·88	·61	7·87	1·27	·84	·33	11·77	23·99	26·99	27·70
Burma { Upper	·46	·10	·62	7·42	·71	·63	·47	16·66	27·07	30·27	34·81
Ajmer-Merwara	·10	3·00	·72	34·95	1·19	·63	·48	3·34	44·41	50·08	50·94

TABLE NO. XVIII.—*Total number of deaths by months.—1911.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1911.	1910.
Bengal ...	141,498	121,358	138,547	136,941	144,346	108,595	140,344	161,862	137,634	167,303	163,904	153,087	1,715,419	32·69	33·10
Eastern Bengal and Assam.	99,236	70,058	63,290	68,955	72,282	57,173	59,677	60,348	56,232	81,713	78,368	86,146	853,478	25·68	33·71
United Provinces of Agra and Oudh.	170,496	164,522	234,693	233,078	184,568	168,219	202,535	152,060	123,865	148,348	170,873	152,035	2,105,292	44·95	38·67
Punjab ...	55,321	53,964	75,760	104,787	106,274	56,991	39,395	35,405	31,459	34,627	38,171	39,765	671,919	34·05	33·28
North-West Frontier Province.	4,987	4,415	4,079	4,053	4,054	4,664	3,630	3,324	3,254	3,403	3,554	4,141	47,558	23·30	26·85
Central Provinces and Berar.	36,759	36,979	37,583	35,140	44,030	33,067	37,262	46,511	44,354	45,665	42,583	42,564	482,497	34·67	44·88
Madras Presidency.	85,002	72,818	70,595	64,462	68,318	72,854	87,395	83,432	76,163	77,620	78,967	95,884	933,510	23·1	24·7
Coorg ...	415	425	451	393	526	597	562	526	478	480	387	455	5,695	32·55	37·77
Bombay Presidency.	46,223	46,433	46,945	43,245	39,133	32,985	39,391	47,222	56,441	57,496	50,613	49,185	555,312	28·35	30·30
Burma { Lower	12,458	11,876	11,255	12,683	12,499	13,887	15,555	14,753	13,107	11,902	11,396	11,941	153,312	23·99	26·99
Burma { Upper	7,941	6,720	6,700	6,288	6,010	7,912	9,414	9,121	8,617	8,880	8,547	8,220	94,370	27·07	30·27
Ajmer-Merwara.	1,724	2,012	2,610	2,688	2,311	1,500	1,378	1,186	1,175	1,410	1,605	1,583	21,182	44·41	50·08
Total ...	662,060	591,580	692,508	712,713	684,351	558,444	636,538	615,750	552,779	638,847	648,968	645,006	7,639,544	32·01	33·20

TABLE NO. XIX.—*Ratio of deaths from all causes according to months.—1911.*

Province.	ANNUAL* DEATH RATE PER MILLE FOR THE MONTH OF												Ratio for the year.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Bengal	31·75	30·15	31·09	31·75	32·39	25·18	31·49	36·39	31·92	37·54	38·01	34·35	32·69
Eastern Bengal and Assam ...	35·16	27·48	22·43	25·25	25·61	20·93	21·15	21·38	20·59	28·95	28·69	30·52	25·68
United Provinces of Agra and Oudh ...	42·86	45·79	59·00	60·55	46·40	43·70	50·92	38·23	32·18	37·29	44·39	38·22	44·95
Punjab	33·01	35·65	45·21	64·61	63·42	35·14	23·51	21·13	19·40	20·66	23·54	23·73	34·05
North-West Frontier Province ...	28·77	28·20	23·53	24·16	23·39	27·80	20·94	19·17	19·40	19·63	21·19	23·89	23·30
Central Provinces and Berar ...	31·10	34·64	31·80	30·72	37·25	28·91	31·53	39·35	38·78	38·64	37·23	36·01	34·67
Madras Presidency	24·81	23·53	20·60	19·44	19·94	21·97	25·50	24·35	22·97	22·65	23·81	27·98	23·1
Coorg	27·93	31·66	30·35	27·33	35·39	41·51	37·82	35·39	33·24	32·30	26·91	30·62	32·55
Bombay Presidency	27·79	30·90	28·22	26·86	23·52	20·49	23·68	28·39	35·06	34·56	31·44	29·57	28·35
Burma ... { Lower	22·95	24·22	20·73	24·14	23·02	26·43	28·65	27·18	24·95	21·92	21·69	22·00	23·99
Burma ... { Upper	26·82	25·12	22·62	21·94	20·29	27·61	31·79	30·80	30·07	29·99	29·82	27·76	27·07
Ajmer-Merwara	42·56	54·99	64·44	68·57	57·05	38·27	34·02	29·28	29·98	34·81	40·95	39·08	44·41
India ...	32·66	32·31	34·16	36·33	33·76	28·47	31·40	30·37	28·18	31·51	33·08	31·82	32·01

* The ratios in this statement have been calculated with reference to the number of days in each month.

TABLE NO. XX—*Deaths from CHOLERA in the different provinces in India from 1880 to 1911.*

YEAR.	* Bengal.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.-W. Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1880	39,643	2,083	71,546	274	...	330	1	613	...	684	2,638	...	3	...	299	...	25
1881	79,180	5,010	25,865	5,207	...	9,140	3,404	9,446	3	16,694	5,239	...	16	197	581	1,721	25
1882	182,352	21,055	89,372	39	...	11,932	3,573	23,604	31	7,904	7,177	...	289	1,327	1,562	150	893
1883	96,439	14,908	18,160	190	...	16,235	27,897	36,284	...	37,954	2,185	...	87	797	1,746	1,947	124
1884	134,421	22,276	30,143	614	...	149	87	75,476	...	13,804	5,515	...	227	1,297	1,018	2,479	330
1885	173,767	7,753	63,457	1,936	...	21,868	3,683	58,169	...	37,287	7,685	...	100	1,615	4,624	1,387	2,677
1886	118,368	20,188	34,565	12	...	16,679	976	12,417	...	167	4,027	...	765	173	290	499	10
1887	172,578	7,941	200,628	8,804	...	12,576	14,396	28,359	3	25,711	2,649	...	384	2,612	8,868	2,831	832
1888	111,391	9,693	18,704	14,938	...	921	305	58,677	2	36,500	15,982	...	13	32	191	2,057	1,015
1889	171,103	18,288	48,494	2,838	...	52,588	10,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	145,885	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	229,575	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	259,398	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	126,975	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	236,150	13,497	178,079	113	...	7,043	3,452	42,289	8	33,588	7,428	...	...	2	5,210	1,862	328
1895	177,087	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	226,824	17,042	69,147	5,146	...	52,985	12,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	196,247	33,240	44,208	622	...	57,131	10,122	143,445	105	57,109	8,538	...	19	1,496	13,202	1,039	4,248
1898	65,020	11,149	2,508	33§	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	107,678	8,380	8,142	1,816	...	76‖	541	29,082	...	8,579	4,942	2,050	1	498	...	...	123
1900	345,878	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	110,753	7,468	53,995	180	117	49	17	81,370	58	13,600	3,552	‡	50	6	72	1	11,351
1902	150,971	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	203,405	8,360	47,159	14,688	1,354	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	137,701	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	146,339	142,312**	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	192,596	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	205,702	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	413	1	4,972
1908	268,908	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,730	937	2,449
1909	56,711	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	403	1,421	164	1,629
1910	162,611	117,969	102,402	2,131	1,605	5,316	...	37,594	56	3,694	1,834	177	2	8	2,864	2	1,812
1911	124,560	39,248	117,689	1,260	12	2,998	...	58,174	6	5,817	2,595	1,596	50	85	1,054	803	201

* Excluding Calcutta from 1880 to 1892.
† Statistics from 1880 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1880-1900 included in the Punjab.

TABLE NO. XXI.—*Deaths from cholera in British Provinces, by months, during the year 1911.*

Province.	January.	February.	March.	April.	May.	June.	July	August.	September.	October.	November.	December.	Total.	RATIO PER 1,000 OF POPULATION. 1911.	1910.
Bengal ...	5,750	3,601	4,993	10,813	12,092	10,905	16,205	18,856	7,007	9,511	14,393	10,434	124,560	2·37	3·21
Eastern Bengal and Assam.	8,739	3,732	3,146	5,733	3,972	1,369	840	607	637	1,256	3,753	5,473	39,248	1·18	3·95
United Provinces of Agra and Oudh.	96	81	127	1,448	3,457	19,771	52,081	16,250	4,921	8,565	9,133	1,759	117,689	2·51	2·15
Punjab ...	...	...	...	6	16	29	12	180	622	385	10	...	1,260	0·06	0·11
North-West Frontier Province.	...	...	...	...	...	...	...	...	10	2	...	...	12	0·01	0·84
Central Provinces and Berar.	17	13	...	5	29	61	534	756	484	533	321	245	2,998	·22	·44
Madras Presidency.	6,455	4,018	2,410	2,493	3,590	5,834	7,289	6,513	2,711	2,748	3,939	10,174	58,174	1·4	0·9
Coorg ...	...	...	...	...	...	1	...	...	...	...	...	5	6	·03	·31
Bombay Presidency.	99	80	278	208	182	556	935	1,072	826	951	278	352	5,817	·30	·26
Burma { Lower	141	145	268	587	407	182	190	48	4	48	126	449	2,595	·41	·33
Burma { Upper	...	4	151	153	46	89	224	279	167	291	128	64	1,596	·46	·06
Ajmer-Merwara.	...	...	...	...	...	...	...	...	...	...	50	...	50	·10	·004
Total ...	21,288	11,674	11,373	21,446	23,791	38,797	78,310	44,561	17,389	24,290	32,131	28,955	354,005	1·48	1·90

TABLE NO. XXII—*Details of the distribution and occurrence of cholera during the year 1911.*

Province.	Mortality in 1911.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Bengal	2·37	3·37	2·41	2·37	11·01	5·94	16·97	August.
Eastern Bengal and Assam ...	1·18	2·61	1·17	1·18	7·94	2·62	8·22	January.
United Provinces of Agra and Oudh ...	2·51	1·59	1·56	2·58	8·68	14·89	9·92	July.
Punjab	0·06	0·21	0·10	0·06	*1·11	0·91	3·17	September.
North-West Frontier Province ...	0·01	0·48	0·06	0·01	*·04	0·004	0·37	September.
Central Provinces and Berar ...	·22	1·09	·48	·19	1·04	·73	9·27	August.
Madras Presidency	1·4	2·4	2·0	1·4	12·83	4·3	31·1	December.
Coorg	0·3	·53	·10	·03	·40	·19	·27	December.
Bombay Presidency	·30	·95	·21	·31	2·13	2·26	3·92	August.
Burma { Lower	·41	1·03	·96	·33	2·42	1·10	9·77	April.
Burma { Upper	·46	·87	1·63	·35	2·44	·95	8·46	October.
Ajmer-Merwara	·10	·12	·32	·02	·41	·57	·83	November.

* Including towns.

TABLE NO. XXIII.—*Small-pox mortality—1911.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	388	659	67	247	103	137	1,945	5	475	133	6	40	4,205
February	420	719	87	242	99	146	2,110	33	563	363	33	46	4,861
March	640	923	164	382	132	213	2,826	41	863	886	66	167	7,302
April	798	1,207	230	431	97	366	2,665	49	806	926	90	336	7,895
May	815	1,299	244	714	107	221	2,211	63	706	995	76	249	7,700
June	498	1,046	214	732	84	209	1,871	35	281	685	44	117	5,816
July	368	754	218	440	48	138	2,956	20	249	500	14	31	4,836
August	230	471	102	358	21	134	1,785	4	126	388	10	29	3,658
September	116	245	28	196	24	63	1,446	3	139	208	9	6	2,474
October	86	395	17	170	50	56	1,560	5	73	237	6	19	2,674
November	236	280	47	339	72	41	1,680	8	137	112	3	150	3,105
December	146	352	61	773	113	97	1,662	31	318	210	4	242	4,009
Total ...	4,741	8,350	1,479	5,024	950	1,714	23,817	297	4,727	5,643	361	1,432	58,535
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1911	·09	·25	·03	0·25	0·47	·12	0·6	1·70	·24	·88	·10	3·00	·25
Ratio per 1,000 of population, 1910	·14	·35	·02	0·15	0·43	·23	0·5	·25	·25	·31	·03	·16	0·23
Difference ...	—·05	—·10	+·01	+·10	+ 04	—·11	+·1	+1·45	—·01	+·57	+·07	+2·84	+·02
Mean ratio per 1,000 during 1906-1910 ...	·50	·35	·43	·60	0·40	·50	0·6	·61	·20	·45	·19	·72	·47
Difference ...	—·41	·10	—·40	—·35	+0·07	—·38	...	+1·09	+·04	+·42	—·09	+2·28	—·22
II.—District mortality excluding towns :—													
Number of districts affected ...	29	21	44	28	5	24	24	5	25	17	10	17	249
Highest district ratio	·35	·95	·14	·88	1·05	·47	1·1	3·01	1·74	3·60	·55	10·18	10·18
Name of that district	Balasore	Mymensingh.	Aligarh.	Jhelum.	Dera Ismail Khan.	Nagpur.	Tanjore.	Nanjarapatna.	Karachi.	Tharrawaddy.	Yamethin.	Goelia.	Goelia.
Lowest district ratio	·002	·002	·01	·01	·03	·01	0·04	·48	·003	·02	·01	·06	·002
Name of that district	Khulna.	Cachar.	Muttra.	Kangra.	Hazara.	Chhindwara.	Anantapur.	Yedenalknad.	Dharbar.	Tayo.	Mandalay.	Pisangan. R. D.	Cachar.
Number of districts without mortality.	3	1	4	1	*Nil*	...	*Nil*	*Nil*	*Nil*	1	1	*Nil*	11
District death rate per 1,000 of population.	·08	·24	·02	0·22	0·45	·11	0·5	1·64	·17	·73	·07	3·29	·21
III.—Town mortality :—													
Number of towns affected ...	48	21	46	79	8	33	142	2	36	35	10	6	166
Highest town ratio	4·65	3·81	2·93	5·86	1·83	3·59	15·3	3·35	5·63	9·19	12·37	4·76	15·3
Name of that town	Bhagalpur.	Barpeta.	Hathras.	Kalabagh.	Lakki.	Hiwar-Khed.	Cannanore.	Mercara.	Malegaon.	Minhla.	Yamethin.	Ajmer Town.	Cannanore.
Lowest town ratio	·02	·03	·01	·04	0·19	·03	0·02	1·35	·04	·16	·06	·05	·01
Name of that town	Garden Reach.	Chittagong.	Cawnpore.	Jhang Maghiana	Tank.	Amraoti.	Vizagapatam.	Virajendrapet.	Bijapur.	Zalun.	Myingyan	Beawar Town.	Cawnpore.
Number of towns without mortality.	83	33	49	51	5	74	127	*Nil*	29	6	8	*Nil*	465
Town death rate per 1,000 of population.	·17	·34	·11	0·56	0·62	·28	1·0	2·60	·71	1·56	·45	2·24	·59
IV.—Infantile mortality :—													
Children under one year... ...	757	1,383	557	1,130	204	489	7,246	*Nil*	1,212	490	16	533	14,017
Children, 1—10 years	1,591	2,613	768	3,005	575	798	7,700	*Nil*	1,981	1,560	102	*888	21,581
Percentage of children in total small-pox mortality.	49·53	47·86	89·59	82·30	82·00	75·09	62·75	*Nil*	67·55	36·33	32·69	93·23	60·81

* Under 12 years.

TABLE NO. XXIV.—*Fever mortality—1911.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months													
January	83,378	69,608	101,045	30,530	3,889	15,493	27,579	346	21,712	4,759	2,283	1,486	362,108
February	70,003	50,226	90,799	26,824	3,319	15,653	23,720	344	21,777	4,458	1,830	1,684	310,637
March	76,698	45,615	107,000	29,063	2,869	16,457	23,967	343	21,565	3,475	1,783	1,983	330,818
April	78,865	48,663	115,442	27,433	2,875	17,808	21,537	297	19,459	4,032	1,739	1,921	340,071
May	94,567	53,855	125,297	31,233	2,907	24,848	23,069	413	18,179	3,708	1,535	1,724	381,315
June	68,785	43,434	118,505	29,770	3,535	18,972	23,587	493	14,942	4,334	2,047	1,191	328,715
July	85,590	45,766	116,897	23,891	2,782	17,895	28,696	456	15,864	5,103	2,519	1,142	346,001
August	99,818	46,207	103,476	20,842	2,535	21,937	26,260	434	16,701	4,891	2,488	979	346,568
September	92,505	42,390	88,905	17,649	2,492	21,283	25,077	406	16,432	4,362	2,317	971	313,889
October	115,039	62,012	104,872	19,807	2,561	23,008	23,973	400	17,237	3,720	2,341	1,208	376,168
November	112,234	56,632	124,515	22,401	2,773	21,617	24,003	304	19,268	3,634	2,385	1,217	390,983
December	103,867	61,393	112,645	22,974	3,167	20,438	27,820	319	19,901	3,797	2,602	1,160	380,083
Total ..	1,081,349	625,821	1,308,498	302,417	35,704	234,489	298,688	4,555	223,027	50,273	25,869	16,666	4,207,356
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1911	20·60	18·82	27·94	15·33	17·48	16·85	7·4	26·03	21·38	7·87	7·42	34·95	19·63
Ratio per 1,000 of population, 1910...	20·42	23·31	27·07	17·10	19·53	21·43	8·7	31·65	14·26	9·62	8·89	31·80	19·17
Difference ...	+·18	−4·49	+·87	−1·77	−2·05	−4·58	−1·3	−5·62	+7·12	−1·75	−1·47	+3·15	+·46
Mean ratio per 1,000 during 1906-1910	21·25	20·29	31·05	22·95	22·72	18·28	8·0	27·42	13·70	9·75	8·30	28·96	20·48
Difference ...	−·65	−1·47	−3·11	−7·62	−5·24	−1·43	−·6	−1·39	+·68	−1·88	−·88	+5·99	−1·85
II.—District mortality excluding Towns :—													
Number of districts affected ...	32	22	48	29	5	24	24	5	25	18	11	17	260
Highest district ratio	31·43	35·70	40·99	21·55	19·63	27·64	20·0	37·07	19·67	12·81	15·54	46·75	46·75
Name of that district	Shahabad	Dinajpur	Farrukhabad.	Muzaffargarh.	Kohat	Damoh	Cuddapah	Nanjarajpatna.	Ahmedabad.	Thayetmyo.	Mandalay	Srinagar	Srinagar.
Lowest district ratio	7·30	9·54	18·80	5·30	15·49	6·67	2·7	18·18	5·18	2·42	3·89	26·42	2·42
Name of that district	Puri ...	Sibsagar	Dehra Dun.	Simla	Dera Ismail Khan.	Buldana	N. Arcot	Yedenalknad.	Belgaum	Maubin	Sagaing	Sawar	Maubin.
Number of districts without mortality.	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*
District death rate per 1,000 of population.	21·39	19·02	28·12	15·25	17·86	17·41	7·7	26·77	12·01	8·37	7·76	39·37	18·19
III.—Town mortality :—													
Number of towns affected ...	131	54	95	130	13	107	267	2	65	41	18	6	929
Highest town ratio	37·41	29·33	46·20	43·01	21·45	26·89	25·3	16·75	34·97	13·17	5·57	48·29	48·29
Name of that town	Kumarkhali.	Malda	Deoband	Faridabad	Nawashahr.	Hoshangabad.	Mudugula	Mercara	Amarkot	Kawkareik.	Salin ...	Beawar Town.	Beawar.
Lowest town ratio	2·05	1·77	4·90	0·82	2·97	1·58	0·1	8·89	1·64	1·15	1·40	13·10	0·1
Name of that town	Balasore	Mangaldai	Meerut	Khangah Dogran.	Tank ...	Khamgaon.	Dharapuram.	Virajendrapet.	Gokak	Maubin	Myingyan	Ajmer Town.	Dharapura.
Number of towns without mortality	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	2	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	2
Town death rate per 1,000 of population.	9·51	10·00	25·40	16·00	13·99	10·53	5·0	13·83	7·53	4·33	3·69	23·08	11·22

TABLE NO. XXV.—*Dysentery and Diarrhœa mortality—1911.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—													
A.—Deaths by months—													
January	3,778	2,071	1,063	677	15	2,506	5,637	4	2,296	476	114	34	18,671
February	2,877	1,533	1,042	557	10	2,369	4,874	7	2,011	386	76	45	15,787
March	2,779	1,426	1,317	694	13	2,514	4,503	9	2,125	402	144	53	15,979
April	2,999	1,652	1,848	870	23	2,898	4,387	8	2,160	623	112	32	17,612
May	3,320	1,924	2,658	1,862	41	3,222	4,548	12	2,150	801	188	53	20,779
June	2,557	1,834	2,595	1,411	28	2,591	5,050	11	2,271	971	344	41	19,705
July	4,184	1,916	2,886	1,028	19	4,816	6,772	8	3,146	1,174	445	61	26,755
August	5,410	1,868	2,494	915	20	6,817	6,257	9	3,782	945	299	43	28,859
September	4,461	1,846	2,058	857	21	5,443	5,321	8	3,471	780	217	51	24,564
October	4,409	2,269	2,312	1,089	30	4,464	4,980	17	2,741	560	185	75	23,131
November	3,666	2,209	2,185	999	21	3,292	5,256	14	2,477	494	176	46	20,835
December	3,473	2,052	1,676	754	18	3,845	6,804	9	2,619	536	141	32	20,959
Total ...	43,913	22,600	24,135	11,713	259	43,777	64,389	116	31,549	8,148	2,471	566	2,53,636
B.—Annual death ratios :—													
Ratio per 1,000 of population, 1911...	·83	·69	·51	0·59	0·13	3·15	1·6	·66	1·61	1·27	·71	1·19	1·06
Ratio per 1,000 of population, 1910...	·90	·85	·38	0·50	0·23	4·45	1·6	1·50	2·52	1·22	·74	·92	1·18
Difference ...	—·07	—·16	+·13	+·09	—·10	—1·30	...	—·84	—·91	+·05	—·03	+·27	—·12
Mean ratio per 1,000 during 1906-1910...	·94	·74	·42	0·75	0·22	3·62	1·6	1·58	2·58	1·58	·73	1·16	1·19
Difference ...	—·11	—·05	+·09	—·16	—·09	—·47	...	—·92	—·97	—·31	—·02	+·03	—·13
II.—District mortality excluding towns :—													
Number of districts affected ...	32	22	48	29	5	24	24	5	25	18	11	8	251
Highest district ratio	3·94	4·60	9·57	4·24	0·31	8·48	4·8	1·12	4·44	1·89	1·16	·58	9·57
Name of that district	Puri.	Darrang.	Garhwal.	Simla.	D.I Khan	Akola.	Nilgiris.	Padinal-knad.	Sholapur.	Kyauk-pyu.	Pakokku.	Kekri.	Garhwal
Lowest district ratio	·03	·03	·02	0·06	0·004	·12	0·3	·08	·01	·27	·10	·04	0·004
Name of that district	Shahabad	Malda.	Bahraich.	Hoshiar-pur.	Kohat.	Bhandara.	Vizagapa-tam.	Yedenalk nad.	Upper Sind Frontier.	Toungoo.	Kyaukse.	Ajmer.	Kohat.
Number of districts without mortality.	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	9	9
District death rate per 1,000 of population.	·73	·66	·34	0·46	0·08	3·07	1·3	·38	1·47	·99	·56	·08	·91
III.—Town mortality :—													
Number of towns affected ...	127	51	87	120	11	106	251	2	64	40	17	5	881
Highest town ratio	9·47	4·66	10·15	10·33	1·49	17·30	13·0	9·43	9·96	12·09	6·35	7·81	17·30
Name of that town	Gaya.	Tezpur.	Saran.	Dharm-sala.	Buffa.	Balgoan.	Palam-cottah.	Virajend-rapet.	Sholapur.	Wakema.	Maymyo.	Ajmer. Suburb.	Balgoan.
Lowest town ratio	·10	·22	·05	0·17	0·12	·10	0·1	2·87	·06	·11	·35	·43	·05
Name of that town	Chatra.	Cox's bazar.	Kanauj.	Hafizabad	Kohat.	Ramtek.	Kalahasti.	Mercara.	Larkhana.	Letpadan.	Nyaungu.	Kekri Town.	Kanauj.
Number of towns without mortality	4	3	8	10	2	1	18	*Nil*	1	1	1	1	50
Town death rate per 1,000 of population.	2·29	1·42	2·92	1·83	0·61	4·00	3·7	5·31	2·50	3·24	2·32	4·14	2·83

TABLE NO. XXVI.—*Plague mortality—1911.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL. 1911.	TOTAL. 1910.
BRITISH PROVINCES.														
Bengal	13,017	15,028	24,435	14,146	3,001	313	361	156	103	905	1,043	3,173	75,681	46,584
Eastern Bengal and Assam	4	1	5	...	...	...	...	17	...	...	...	...	27	46
United Provinces of Agra and Oudh.	46,234	51,899	103,686	88,760	26,263	972	302	99	259	1,284	3,752	8,791	332,301	158,074
Punjab	7,971	11,472	30,149	61,177	54,742	8,301	284	55	15	123	394	662	175,345	135,483
North-West Frontier Province.	19	9	31	84	88	12	...	...	...	...	2	...	243	30
Central Provinces and Berar	5,507	5,816	5,570	1,380	123	7	52	461	1,663	1,973	2,033	3,353	27,938	28,961
Madras Presidency ...	1,559	1,118	717	208	79	218	782	1,544	2,304	3,087	1,943	1,626	15,185	4,867
Coorg	1	...	2	...	...	...	...	1	8	3	10	32	57	9
Bombay Presidency ...	5,536	6,077	5,763	4,480	2,580	1,409	3,638	9,318	19,582	20,456	12,723	8,837	100,399	25,043
Burma { Lower ...	359	460	498	442	515	591	534	221	120	46	32	88	3,906	4,417
Burma { Upper ...	744	683	371	51	14	19	27	30	37	40	42	96	2,154	3,324
Ajmer-Merwara ...	2	25	142	152	24	...	...	...	...	...	1	...	346	6,517
TOTAL { 1911 ...	80,953	92,587	171,369	170,880	87,429	11,842	5,980	11,962	24,091	27,917	21,974	26,658	733,582	...
TOTAL { 1910 ...	51,091	69,954	104,219	74,850	32,886	4,196	1,887	3,494	5,748	8,761	20,062	36,207	...	413,355
NATIVE STATES, ETC.														
Eastern Bengal and Assam Native States.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh Native States.	604	820	1,085	870	275	13	...	1	...	...	...	1	3,669	211
Punjab Native States ...	1,180	1,985	3,365	8,327	6,752	1,224	21	...	...	2	35	110	23,001	34,338
Jammu and Kashmir States	43	27	73	394	456	103	...	...	...	...	...	...	*1,096	339
Baluchistan	...	...	2	1	...	...	...	...	...	...	...	...	3	21
Rajputana	2,647	3,330	5,111	4,792	1,662	389	19	38	37	69	194	148	18,436	34,578
Central India	2,842	2,109	2,127	840	181	3	12	196	866	3,513	2,029	1,411	16,129	6,083
Native States in Central Provinces	...	...	...	...	...	...	...	...	4	9	60	300	373	...
Bombay Presidency Native States.	1,358	1,226	1,407	1,656	861	341	431	1,906	3,037	2,713	1,713	820	17,469	11,170
Hyderabad State ...	1,032	784	699	250	8	...	114	364	854	2,471	4,273	6,730	17,579	5,366
Mysore	1,317	591	422	241	211	448	1,302	2,090	2,348	2,273	1,960	1,414	14,617	6,338
Bangalore, Civil and Military Station.	57	51	35	11	13	13	43	92	119	150	141	123	848	804
Madras Native States ...	...	...	...	...	1	...	...	...	4	47	7	12	71	2
TOTAL { 1911 ...	11,080	10,923	14,326	17,382	10,420	2,534	1,942	4,687	7,269	11,247	10,412	11,069	113,291	...
TOTAL { 1910 ...	5,541	9,917	18,428	18,022	11,709	1,163	981	2,577	5,790	7,985	8,508	8,613	...	99,250
GRAND TOTAL { 1911 ...	92,033	103,510	185,695	188,262	97,849	14,376	7,922	16,589	31,360	39,164	32,386	37,727	846,873	...
GRAND TOTAL { 1910 ...	56,632	79,871	122,647	92,872	44,595	5,365	2,868	6,071	11,538	16,746	28,570	44,830	...	512,605
Calcutta City	47	63	218	597	366	204	111	40	26	20	31	13	1,736	1,262
Bombay City	110	385	871	1,293	799	197	111	65	60	33	30	43	3,997	3,641
Madras City	1	...	...	...	...	...	...	...	...	...	1	1	3	5

* Jammu Province only.

TABLE No. XXVII—*Mortality from Respiratory Diseases—1911.*

Provinces, Districts, Towns.	Bengal.	Eastern Bengal and Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces:—													
A.—Deaths by months—													
January	1,620	454	2,059	4,562	143	3,058	3,297	11	4,904	387	175	42	20,712
February	1,642	421	2,262	4,436	105	3,287	3,036	5	4,972	409	166	43	20,784
March	1,392	414	2,473	4,464	127	3,124	3,048	6	4,963	404	166	36	20,617
April	1,279	405	2,406	4,119	129	2,907	2,695	4	4,375	419	179	34	18,951
May	1,224	301	2,233	4,623	136	2,945	2,624	1	3,826	389	141	15	18,458
June	887	351	1,779	3,920	151	2,346	2,666	1	3,176	521	189	7	15,994
July	1,121	330	2,051	3,242	113	2,820	3,294	8	3,651	511	241	10	17,392
August	1,148	364	1,792	2,935	106	3,039	3,174	3	3,877	507	213	11	17,168
September	1,054	344	1,596	2,729	104	2,963	3,172	6	4,197	414	171	15	16,765
October	1,155	336	1,785	3,029	90	3,189	3,143	4	4,137	477	169	15	17,529
November	1,324	463	2,220	3,499	94	3,401	3,176	8	4,467	481	190	29	19,352
December	1,356	402	1,993	3,736	101	3,272	3,386	10	4,925	464	208	42	20,108
Total ...	15,402	4,385	24,654	45,294	1,399	36,351	36,711	67	51,470	5,383	2,207	299	223,822
B.—Annual death ratios:—													
Ratio per 1,000 of population, 1911...	·29	·14	·53	2·30	0·69	2·61	0·9	·38	2·63	·84	·63	·63	·94
Ratio per 1,000 of population, 1910	·30	·15	·45	2·34	·95	3·48	1·0	·35	3·34	·84	·76	·61	1·03
Difference ...	—·01	—·01	+·08	—·04	—·26	—·87	—·1	+·03	—·61	...	—·13	+·02	—·09
Mean ratio per 1,000 during 1906-1910....	·28	·11	·42	2·82	0·84	2·53	0·8	·30	3·10	·84	·76	·63	·97
Difference ...	+·01	+·03	+·11	—·52	—·15	+·08	+·1	+·08	—·47	...	—·13	...	—·03
II.—District mortality excluding towns:—													
Number of districts affected ...	32	22	48	29	5	24	24	4	25	18	11	5	247
Highest district ratio	1·62	1·99	9·71	9·61	1·23	10·67	2·6	·29	7·67	·83	1·13	·28	10·67
Name of that district	Puri	Lakhimpur.	Hamirpur.	Delhi	Hazara	Saugor	Anantpur.	Yedenalknad.	Kaira	Pegu	Shwebo	Masuda	Saugor
Lowest district ratio	·0005	·003	·01	0·01	0·15	·17	0·2	·05	·01	·01	·02	·04	·0005
Name of that district	Purnea	Noakhali	Gonda	Multan	Peshawar	Bhandara	Vizagapatam.	Nanjarajpatna.	Upper Sind Frontier	Toungoo.	Kyaukse	Kekri	Purnea
Number of districts without mortality	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1	Nil	Nil.	Nil	12	13
District death rate per 1,000 of population.	·16	·13	·30	1·97	0·47	2·38	·8	·11	1·86	·37	·25	·05	·70
III.—Town mortality:—													
Number of towns affected ...	108	42	89	180	13	106	203	2	62	32	15	5	807
Highest town ratio	6·60	2·51	18·39	18·56	7·75	55·51	8·1	6·70	16·31	9·28	10·99	4·80	55·51
Name of that town	Maniktala	Goalpara	Rath	Kila Sobha Singh.	Haripur	Mowar	Gooty.	Mercara	Kaira	Yandoon	Myingyan	Nasirabad Town.	Mowar
Lowest town ratio	·04	·04	·06	0·16	0·39	·17	0·04	1·89	·12	·07	·35	·14	·04
Name of that town	Sasaram	Sirajganj	Man	Shujabad	Tank	Umrer	Srirangam	Virajendrapet.	Larkhara	Thaton	Pokokku	Kekri Town.	Srirangam
Number of towns without mortality	23	12	6	Nil	Nil	1	66	Nil	3	9	3	1	124
Town death rate per 1,000 of population.	2·10	·32	3·67	5·32	2·78	5·19	1·8	4·91	7·35	4·13	4·80	2·17	3·58

TABLE NO. XXVIII.—VACCINATION.

A.—*Total primary vaccinations and re-vaccinations, successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1911-12.*

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of persons vaccinated by each vaccinator of the Special Staff.	Total cost of the Special‡ Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccination.	Primary.	Re-vaccination.	Under one year.	1 to 6 years		Rs.	Rs. A. P.
Bengal	1,974,927	79,829	99·26	59·67	1,043,179	818,645	1,181	199,666	0 1 7
†Eastern Bengal	1,115,741	93,704	96·10	75·36	296,544	655,593	1,405	54,652	0 0 9
†Assam	290,915	14,930	98·14	80·98	62,068	172,899	877	64,501	0 3 8
United Provinces of Agra and Oudh	1,391,266	103,291	97·65	78·13	941,980	357,792	1,620	153,200	0 1 7
Punjab	701,700	190,589	95·03	71·85	525,314	101,448	3,170§	124,320	0 2 8
North-West Frontier Province	112,579	21,223	98·74	83·66	63,280	33,557	3,376‖	15,493	0 2 0
Central Provinces and Berar	599,067	83,110	98·89	78·48	443,702	131,341	1,994	72,643	0 1 10
Madras	1,455,485	147,492	89·7	77·2	563,637	572,092	1,861¶	(b) 316,559	0 3 9
Coorg	8,425	4,944	94·83	81·92	598	3,797	1,462	2,818	0 3 10
Bombay	692,413	68,707	99·00	51·18	501,708	118,758	1,718	353,707	0 8 9
Burma	422,521	94,871	96·61	71·79	92,154	205,637	(a) 1,850	200,604	0 7 5
Ajmer-Merwara	15,486	1,034	98·17	81·81	9,499	3,487	1,108	3,098	0 3 2
Total	8,780,525	903,724	96·34	72·82	4,543,663	3,175,046	1,584	1,561,261	0 2 10

* Excluding those the results of which were not known.
† Separate reports received for each province for 1911-12.
‡ Excluding dispensaries.
§ Including vaccinations performed in Cantonments.
‖ Including vaccinations performed in Cantonments and Political Agencies.
¶ Excludes average of work done by each medical subordinate.
(*a*) Excluding the work done by private medical practitioners.
(*b*) Excluding Madras town.

B.—*Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1911-12.*

Province.	Population.	Number of operations performed (primary and re-vaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small-pox.*	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Bengal	50,221,069	1,937,714	117,042	2,054,756	37·78	51·93	4,741	·09
†Eastern Bengal	17,534,554	1,206,849	2,596	1,209,445	63·82	42·28	‡8,350	‡·25
†Assam	7,059,857	304,167	1,678	305,845	41·85	21·98		
United Provinces of Agra and Oudh	46,835,108	1,494,173	384	1,494,557	30·26	50·28	1,479	·03
Punjab	19,961,008	890,699	1,590	892,289	37·67	65·79	5,024	0·25
North-West Frontier Province	3,109,484	132,529	1,273	133,802	39·73	50·88	950	0·47
Central Provinces and Berar	16,033,310	675,618	6,559	682,177	39·99	69·18	1,714	·12
Madras	40,388,179§	1,602,782	195	1,602,977	34·5	34·89	23,817	0·6
Coorg	174,976	13,161	208	13,369	66·00	8·54	297	1·70
Bombay	22,657,077	752,933	8,187	761,120	28·64	55·36	4,727	·24
Burma	12,115,217	507,475	9,917	517,392	36·96	19·02	6,004	·61
Ajmer-Merwara	501,395	16,520	Not available	16,520	31·13	47·36	1,432	** 3·00
Total	236,591,234	9,534,620	149,629	9,684,249	37·22	48·01	58,535	·25

*For the Calendar year, from the Provincial Sanitary reports.
†Separate reports received for each province for 1911-12.
**Calculated on the census population of 1901.
§Excluding the population of Bangalore and Secunderabad Cantonments.
‡Figures are not separately shown for each province.

EAST INDIA (SANITARY MEASURES).

REPORT

ON

SANITARY MEASURES IN INDIA

IN

1912–1913.

VOL. XLVI.

Presented to both Houses of Parliament by Command of His Majesty.

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TABLE OF CONTENTS.

SECTION I.

EUROPEAN ARMY OF INDIA.

PARA.		PAGES.
1.	India	1
2.	Deaths from all causes	1
3.	Enteric fever	1
	Paratyphoid fever	2
	Enterica	3
	Anti-enteric inoculation	4
4.	Pyrexia of uncertain origin	7
5.	Malaria	7
6.	Sandfly-fever	8
7.	Plague	8
8.	Cholera	8
9.	Small-pox	8
	Measles	9
	Scarlet Fever	9
10.	Dengue	9
11.	Rabies	9
12.	Kala Azar	9
13.	Beri-beri	9
14.	Dysentery and Liver Abscess	10
15.	Poisoning	10
16.	Venereal diseases	10
17.	Invaliding	12
18.	Officers	13
19.	Women	14
20.	Children	15

SECTION II.

INDIAN ARMY.

21.	India	17
22.	Northern and Southern Armies; Divisions	18
23.	Geographical groups	18
24.	Stations and Regiments	18
25.	Cholera	19
26.	Small-pox	19
27.	Malaria	19
28.	Pyrexia of uncertain origin	20
29.	Sandfly-fever	20
30.	Enteric fever	21
31.	Dengue	21
32.	Mediterranean fever	21
33.	Plague	22
34.	Scurvy	22
35.	Tubercle of the lungs	22
36.	Pneumonia	22
37.	Dysentery	23
38.	Venereal diseases	23
39.	Suicide	23
40.	Commissioned British Officers	23

SECTION III.

GENERAL POPULATION.

PARA.		PAGES.
41.	Meteorology, crops and general conditions	25
42.	Births and deaths	25
43.	Chief diseases	26
44.	Delhi City	27
45.	Bengal	27
46.	City and Port of Calcutta	28
47.	Assam	28
48.	Bihar and Orissa	29
49.	United Provinces	30
50.	Punjab	31
51.	North-West Frontier Province	31
52.	Central Provinces	32
53.	Madras	33
54.	City of Madras	33
55.	Coorg	34
56.	Bombay	34
57.	City and Port of Bombay	35
58.	Burma	35
59.	Rangoon	36
60.	Ajmer-Merwara	36
61.	Red Sea Pilgrim Traffic	36

SECTION IV.

JAILS OF INDIA.

62.	India	39
63.	Prison population in 1912	39
64.	Total sickness and mortality rates	39
65.	Malaria	40
66.	Dysentery	40
67.	Tubercle of the lungs	41
68.	Cholera	41
69.	Enteric fever	41
70.	Bengal	41
71.	Assam	42
72.	Bihar and Orissa	42
73.	United Provinces	43
74.	Punjab	43
75.	North-West Frontier Province	44
76.	Central Provinces	44
77.	Madras	44
78.	Bombay	45
79.	Burma	46
80.	Andamans	46

SECTION V.

VACCINATION.

81.	Vaccination in India	49
82.	Supply of vaccine	49
83.	Delhi	50
84.	Bengal	50

SECTION V—*concld.*

VACCINATION—*concld.*

PARA.		PAGES.
85.	Bihar and Orissa	51
86.	Assam	51
87.	United Provinces	52
88.	Punjab	53
89.	North-West Frontier Province	54
90.	Central Provinces and Berar	54
91.	Madras	55
92.	Coorg	56
93.	Bombay	56
94.	Burma	57
95.	Ajmer-Merwara	57
96.	Vaccination among troops...	57

SECTION VI.

MEDICAL INSTITUTIONS.

A.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private-aided).

97.	India	59
98.	Bengal (excluding Calcutta)	60
99.	Calcutta	60
100.	Assam	60
101.	Bihar and Orissa	60
102.	Central Provinces	60
103.	United Provinces	60
104.	Punjab (including Delhi)	60
105.	North-West Frontier Province	60
106.	Baluchistan	61
107.	Burma	61
108.	Bombay	61
109.	Madras	61
110.	*B.—Civil Hospitals and Dispensaries (State-Special Railway and Private non-aided).*	61
111.	*C.—Lunatic Asylums.*	62
112.	Bengal	63
113.	Assam	63
114.	Bihar and Orissa	63
115.	United Provinces	63
116.	Punjab	63
117.	Central Provinces	63
118.	Bombay	63
119.	Madras	63
120.	Burma	63
	D.—Medical Colleges.	
121.	Bombay	63
122.	Madras	63
123.	Punjab	64
124.	Bengal	64
125.	United Provinces	64
	E.—Medical Schools.	
126.	Assam	64
127.	Burma	64
128.	Bengal	64

SECTION VI—*concld.*

MEDICAL INSTITUTIONS—*concld.*

E.—Medical Schools—concld.

PARA.		PAGES.
129.	United Provinces	64
130.	Punjab	64
131.	Bihar and Orissa	64
132.	Bombay	65
133.	Madras	65
134.	The X-Ray Institute of India	65

SECTION VII.

SANITARY WORKS.

135.	India	67
136.	Bengal	67
137.	Sanitary Board	68
138.	Assam	69
139.	Sanitary Board	69
140.	Bihar and Orissa	69
141.	Sanitary Board	70
142.	United Provinces	70
143.	Sanitary Board	71
144.	Punjab	71
145.	Sanitary Board	72
146.	North-West Frontier Province	72
147.	Central Provinces and Berar	72
148.	Sanitary Board	73
149.	Madras	73
150.	Sanitary Board	74
151.	Bombay	74
152.	Sanitary Board	75
153.	Burma	76
154.	Sanitary Board	76
155.	Military Works	76

SECTION VIII.

GENERAL REMARKS.

156.	Laboratories	77
	Central Research Institute, Kasauli	77
	Bombay Bacteriological Laboratory	78
	King Institute of Preventive Medicine, Madras	79
	Pasteur Institute, Kasauli...	80
	Pasteur Institute of Southern India, Coonoor	80
157.	Instruction in Malaria	81
158.	Sanitary Conference	81
159.	Indian Research Fund	81
160.	Scientific Memoirs	81

SECTION I.

EUROPEAN ARMY OF INDIA.

(From the Director, Medical Services in India.)

India.

1. The average strength of European troops serving in India during 1912 is returned as 71,001 warrant officers, non-commissioned officers and men. The following report on their health is exceptionally good and in some respects constitutes a record over the good reports of former years. The chief features are shown in the following table :—

All causes.	Ratio per 1,000 of strength.		
	1907-11.	1911.	1912.
Admissions	679·7	524·7	547·9
Constantly sick	38·49	28·81	28·86
Deaths in the Command	6·77	4·89	4·62
Invalids sent home	12·88	7·12	6·68
„ finally discharged	7·17	6·20	...
Average sick time to each soldier	14·05	10·52	10·56
Average duration of each case of sickness	20·67	20·05	19·28

It is unnecessary to discuss the general causes which have led to these results: they have been considered in former years and are still operative.

Deaths from all causes—(in India).

2. These number 328 as compared with 354 in 1911. This number is the lowest on record and equivalent to a ratio of 4·62 per 1,000 of strength which also is a record. The chief causes of death were, 26 from enteric fever, 2 from paratyphoid fever, 3 from small-pox, 10 from cholera, 11 from dysentery, 5 from plague, 12 from malaria, 3 from pyrexia of uncertain origin, 2 from tetanus, 20 from pneumonia, 11 from pulmonary tuberculosis, 3 from alcoholism, 2 from multiple neuritis, 19 from appendicitis, 2 from enteritis, 1 from colitis, 1 from intestinal perforation, 23 from suppurative hepatitis, 14 from heatstroke, 1 from sunstroke, 20 from drowning, 1 from hanging, 21 from accidents, 20 from gunshot wounds, mainly suicidal, and 7 from various forms of poisoning.

Enteric Fever.

3. The number of cases of this disease is the lowest on record. Throughout the whole of India only 118 cases are returned with 26 deaths, this gives an admission rate of 1·7 per 1,000 of strength and a death rate of 0·37. The case mortality is 19 per cent.; this is somewhat higher than the rate for previous years. The distribution by branches of the service shows that 15 cases with 2 deaths occurred in the cavalry, 41 cases with 9 deaths in the artillery and ammunition columns, 60 cases with 14 deaths in the infantry and 2 cases with 1 death among staff and departments. Among individual units, the incidence has been fairly evenly distributed, and the units affected have not had more than from 1 to 5 cases among

them. Of garrisons, Poona, Ambala, Secunderabad and Bangalore have shown the largest number of cases. There has been a remarkable freedom from attack among nursing orderlies and others engaged in attendance upon the sick; also there is no evidence to show that water, milk or other articles of food have been the cause of the disease among the troops. Of the 118 cases of enteric fever which occurred, 78 were among inoculated men and 40 among the non-inoculated, but as the inoculated population amounts to about ninety per cent. of the whole, the number of the inoculated exposed to infection is nine times as great as the number of non-inoculated men. Other considerations connected with this question of inoculation against enteric fever will be discussed in a subsequent section of this report. An analysis of the years of service in India, presented by these cases of enteric fever, shows that 35 had been but one year in India, 15 two years, 14 three years, 15 four years, 20 five years, 13 six years, 1 seven years and 5 eight years and over.

Paratyphoid Fever.—As in 1910 and 1911, a differentiation has been carefully made during 1912, between the classical enteric fever and the disease known as paratyphoid fever. For the year under review, the returns show 64 cases of paratyphoid fever with two deaths. From all the cases of paratyphoid fever the specific bacillus has been isolated so that no ambiguity exists as to the accuracy of diagnosis. Of the total cases so diagnosed, 60 yielded the "A" and 4 the "B" variety of the micro-organism. With the exception of one man, all these cases of paratyphoid fever occurred among men who had been inoculated against enteric fever. The chief incidence of this disease has been at Fyzabad, where 25 cases occurred. The incriminating factor seems to have been an undetected and unsuspected infected person, indicating that in this disease, as in enteric fever, man himself is the most dangerous factor. An idea that the bed bug might disseminate the disease was mooted in respect of this series of cases but warranted by no evidence. As regards years of service in India, of the paratyphoid fever cases, 11 had one year, 8 had two years, 12 had three years, 10 had four years, 8 had five years, 5 had six years, 2 had seven years and 4 had eight years or more.

The distribution of paratyphoid fever by branches of the service shows that 8 cases occurred among the cavalry, 15 among the artillery or ammunition columns, and 41 among the infantry. The distribution of paratyphoid fever appears to be very uneven in the various divisions, as compared with enteric fever: the figures for both diseases are shown in the following table :—

Divisions.	Enteric fever.		Paratyphoid A.	
	Admissions.	Deaths.	Admissions.	Deaths.
1st (Peshawar)	2	1	2	...
2nd (Rawalpindi)	17	2	4	...
3rd (Lahore)	15	5	6	1
4th (Quetta)	1		...	...
5th (Mhow)	11	4	4	...
6th (Poona)	19	...	...	...
7th (Meerut)	9	3	9*	...
8th (Lucknow)	15	6	34	1
9th (Secunderabad)	26	5	4	...
Burma	...	...	...	...
Aden	3	...	...	...
Marching	...	...	1	...
Total ...	118	26	64	2

*Including 4 cases of Paratyphoid B.

Enterica.—Under this term we combine the incidence of the two diseases, enteric fever and paratyphoid fever. This grouping is necessary for purposes of comparison with years anterior to 1910. Taking both enteric and paratyphoid fever together, we find that 182 cases occurred among European troops in India in 1912 with 28 deaths. This is equivalent to an admission rate per 1,000 of 2·6 and a death rate of 0·39 per 1,000 of strength. Ten years ago the admission rate was 19·7, and the death rate 3·76. The following table gives the corresponding figures for the last five years :—

Enteric Fever and Paratyphoid A and B.

Years.	Ratio per 1,000.		Case mortality per cent.
	Admissions.	Deaths.	
1908	14·6	2·74	16·9
1909	8·9	1·58	14·3
1910	4·6	·63	11·2
1911	3·8	·33	7·9
1912	2·6	·39	13·1

Another table shows the annual admission rate per 1,000 of strength for enterica during the last five years in all stations having an average strength of over 500 during 1912. The most notable excess rates are in Fyzabad, Barian, Dalhousie, Lucknow, Poona and Secunderabad.

Stations with average annual strength of over 500 during 1912.	1908.	1909.	1910.	1911.	1912.
Peshawar	31·3	11·3	7·9	3·0	·6
Nowshera	19·8	14·3	6·1	6·4	1·9
Rawalpindi	31·9	7·2	5·9	·7	2·7
Gharial	24·8	3·7	2·4	...	...
Barian Camp	14·3	6·2	4·8	8·2	11·3
Sialkot ...	20·9	20·7	15·1	·8	1·9
Lahore Cantonment	11·8	25·9	9·7	4·5	3·8
Dalhousie	10·8	6·9	4·0	...	6·3
Multan ...	30·8	20·3	2·3	4·4	2·2
Ferozepore	9·8	1·0	1·0	1·0	...
Jullundur	17·9	22·5	1·6	...	...
Ambala	8·3	3·1	5·3	...	4·8
Dagshai	2·8	2·9	1·5	9·9	1·3
Meerut...	27·4	26·0	2·3	1·8	3·2
Agra ...	9·8	5·5	2·4	...	...
Bareilly	3·5	15·1	...	16·8	1·5
Ranikhet	14·0	9·6	6·0	·5	1·2
Chakrata	4·3	3·6	1·5	1·6	·9
Lucknow	14·3	23·2	4·2	15·-	5·5
Fort William	5·1	5·8	1·5	·8	4·8
Lebong...	...	1·5	...	1·6	1·6

Stations with average annual strength of over 500 during 1912.	1908.	1909.	1910.	1911.	1912.
Allahabad	7·4	7·3	...	4·2	...
Cawnpore	25·4	...	...	...	1·0
Fyzabad	19·2	13·7	14·2	11·6	30·6
Quetta...	17·9	4·8	2·2	3·5	·3
Karachi	6·0	3·6	3·9	4·4	...
Hyderabad	...	...	...	1·8	...
Mhow	4·1	2·8	6·9	2·7	1·1
Kamptee	11·1	19·5	14·4	3·4	1·0
Nasirabad	5·0	7·2	1·1	6·0	4·5
Jhansi	26·5	7·5	13·1	3·2	1·0
Jubbulpore	34·6	11·9	6·6	4·8	2·7
Poona	9·8	12·4	8·4	3·0	5·3
Kirkee	10·1	26·0	12·0	5·4	·9
Bombay (Colaba)	1·7	·9	2·8	3·9	1·7
Ahmednagar	17·4	9·3	1·7	2·9	1·0
Belgaum	14·6	12·5	8·0	14·0	3·7
Secunderabad	25·9	6·7	3·4	4·5	5·0
Bangalore	19·0	10·9	6·0	4·9	4·6
Madras...	11·7	...	1·5	3·0	...
Wellington	2·9	5·6	1·9	4·3	3·4
Maymyo	...	...	...	...	...
Shwebo	11·3	...	...	...	...
Rangoon	1·6	1·5	·8	·9	...
Aden	1·8	2·7	2·9	...	3·3

Anti-enteric inoculation :—The good work of former years has been maintained. Of the European troops serving in India, ninety per cent. have been inoculated. By arms of the service, 88 per cent. of the cavalry are inoculated, 88 per cent. of the artillery and ammunition columns, 93 per cent. of the infantry, 62 per cent. of the engineers, and 48 per cent. of the staff and departments are similarly protected. The following table shows the result of the returns regarding inoculation as made on the last day of the year :—

Branch of Service.	Number of inoculated men who have not had Enteric Fever.	Number of inoculated men who have had Enteric Fever.	Number of not inoculated men who have not had Enteric Fever.	Number of not inoculated men who have had Enteric Fever.
Cavalry	4,336	122	516	60
Royal Horse Artillery	1,757	29	130	22
Royal Field Artillery	5,998	106	447	122
Royal Garrison Artillery...	3,392	23	600	74
Ammunition Column	726	6	79	29
Infantry	46,068	536	2,513	378
Attached troops	927	11	182	23
Royal Engineers	130	...	68	11
Staff and Departments	671	6	639	95
Total ...	64,005	839	5,174	814

Of the 118 cases of enteric fever which occurred in 1912, we find that 78 were inoculated and 40 were non-inoculated men. Ten deaths occurred among the inoculated and sixteen among the non-inoculated. The ratio per 1,000 of strength of admission for enteric fever among the inoculated was 1·20, and the corresponding ratio of deaths was 0·15. Among the non-inoculated the admission rate was 6·69 per 1,000 and the death rate 2·67. As regards case mortality, the percentage figures are 12·8 for the inoculated and 40 for the non-inoculated. The disparity between the two groups is very marked. On the other hand, the influence of inoculation against paratyphoid infection appears to be negative. This is in accord with our previous experiences. Of the 64 cases of this disease occurring during the year, only one had not been inoculated.

If we take the two diseases, enteric and paratyphoid fever together, we find that the admission rate among the inoculated is 2·17 per 1,000, while among the non-inoculated it is 6·84. The corresponding death rates per 1,000 are 0·43 and 2·7. The figures indicate that against true enteric fever the value of inoculation is most marked, and the case in favour of the procedure is much strengthened by our experiences during 1912. The disturbing factor is paratyphoid fever. The re-inoculation of men against enteric fever, after a lapse of thirty months since their primary inoculation, is being steadily pressed and meets with a steady support from all ranks.

The Enteric Fever Depôts at Naini Tal and Wellington have done excellent work during the year. Owing to the great reduction in prevalence of enteric fever they have been much less crowded than in former years, but this fact constitutes one of the strongest arguments in support of their original inception and maintenance, inasmuch as they are and have been our great defence against the inadvertent liberation on convalescence, among the healthy, of men who are still potentially infective.

To Naini Tal 89 cases of alleged enteric fever were sent, also 67 cases of paratyphoid fever and 82 cases of pyrexia of uncertain origin. Of these, ultimately, 80 were found to be true cases of enteric fever, 55 were cases of paratyphoid (A) fever and 4 were cases of paratyphoid (B) fever. The importance of sending the pyrexia of uncertain origin cases to the enteric fever depôts, as suspicious and possibly dangerous, although their clinical symptoms have not warranted a definite diagnosis of either enteric or paratyphoid fever, is shown by the fact that two paratyphoid carriers, one a chronic urinary case, were detected among them; and had they, under the old system, not been sent to the depôt for critical scrutiny, would have produced a large crop of fresh cases among their fellows. In spite of the character of the cases housed in the depôt, no case of enteric fever was contracted in the depôt during the year; one case, however, of paratyphoid fever (A) occurred. The patient was a convalescent from pyrexia of uncertain origin and occupied the same barrack room as a chronic urinary carrier of bacillus paratyphosus (A). Since then all known carriers have been segregated in one room with separate latrine accommodation. One patient died from pulmonary tuberculosis. He had been sent to the depôt convalescent from pyrexia of uncertain origin. Two other convalescents from pyrexia of uncertain origin turned out to be suffering from kala-azar. The disease appeared to be traceable to Dinapore, and both men were invalided to England. One of the cases exemplified the difficulty in diagnosing accurately the condition, except by liver or spleen puncture, as his temperature chart resembled closely that of typical paratyphoid fever, with long apyrexial intervals. Seven carriers of the bacillus paratyphosus (A) were discovered during the year, but no carrier of (B) typhosus. The details concerning these carriers and how finally disposed of, are given in the table on the following page.

No less than 8,466 bacteriological examinations of dejecta were made during the year, or 4,401 examinations of urine and 4,065 of fæces. An important part of the work of this depôt has been the examination of cultures sent from all parts of India. A total of 217 cultures of this nature were received and examined. This work was inaugurated in 1911, and has been productive of great good as it enables a check or verification of opinions formed in the Divisions concerning various micro-organisms isolated from pyrexias of various kinds. Of the 217 cultures sent up, 84 were suspected to be B. typhosus, 67 to be B. paratyphosus A., 3 to be B. paratyphosus B. and 63 of doubtful nature. Of these, 100 were definitely found to be B. typhosus, 71 were B. paratyphosus A., 3 were B. paratyphosus B. and 43

organisms of various kinds. Of the importance of this work there can be no doubt, as it enables a complete conspectus to be made of the distribution of various micro-organisms all over India. Of the 128 organisms recovered from the blood of patients, there were 21 strains that were neither B. typhosus nor either variety of the B. paratyphosus. Attempts were made to classify them. Of the more important findings it is worthy of record that B. alkaligenes fæcalis occurred five times and B. cloacæ twice. McConkey's bacilli numbers 98, 99 or 103 occurred twice, numbers 69 or 70 occurred twice and number 36 once. The gradual accumulation of facts like this extending over a series of years will do much to throw light on the nature of the infecting micro-organisms associated with pyrexias of obscure origin. It is noteworthy that the B. variety of the paratyphoid bacillus was recovered from the blood on three occasions only, whereas the A. variety was recovered sixty-three times. Important work was carried on with regard to the viability of the A. variety of the paratyphoid bacillus in the fæces from carrier cases when the dejecta were buried in earth as in the trenching system. Previous findings were corroborated, that is, that the fæces remained infectious for long periods in the cold weather but became innocuous within ten days in the warmer months, owing to the rapid multiplication of saprophytic micro-organisms. The viability of the same bacillus in flies fed upon naturally infected fæces was found not to extend beyond twenty-four hours.

Corresponding good work has been done at the depôt for Southern India, at Wellington. Fifty-three convalescents were received in this depôt during the year. Of these, 45 were said to be enteric fever, 5 were said to be paratyphoid A. and 3 were said to be pyrexias of uncertain origin. Of these, 38 were true enteric fever, and 5 were paratyphoid (A) fever. Among these men no enteric carriers were detected, but three paratyphoid (A) carriers were found. Details concerning them are given in the table. The research work at this depôt has been mainly as to the efficacy of treating carrier cases with autogenous vaccines. Although from a curative point of view, earlier hopes have not been confirmed, still the important fact has been elicited that some men are tolerant of very large doses of the paratyphoid A. bacillus, a micro-organism usually regarded as being very toxic.

Carriers in Depôt on January 1st, 1913.

Depôt.	Rank and name.	Number.	Unit.	Place and date of origin.	Period under observation.	Type of carrier.	How finally disposed of.	Sent as a convalescent from
Naini Tal	Pte. C. ...	4203 ...	8th Hussars ...	Lucknow—15th February 1911.	19th February 1912 to 4th November 1912.	Paratyphoid A.	Invalided to England.	Pyrexia of uncertain origin.
,, ...	Pte. S. ...	6062 ...	8th Hussars ...	Lucknow—30th March 1912.	16th April 1912.	Urinary Chronic. Paratyphoid A. Fæcal Acute.	Still in Depôt.	Paratyphoid A. Fever.
,, ...	Pte. C. ...	9300 ...	2nd East Yorkshire.	Fyzabad—24th March 1912.	30th April 1912.	Paratyphoid A. Fæcal Acute.	Ditto ...	Paratyphoid A. Fever.
,, ...	Pte. J. ...	11482 ...	4th Worcesters	Bareilly—21st February 1912.	3rd May 1912 to 4th November 1912.	Paratyphoid A. Fæcal and Urinary.	Invalided to England. Chronic intermittent.	Paratyphoid A. Fever.
,, ...	Pte. W. ...	6759 ...	8th Hussars ...	Lucknow—27th April 1912.	15th May 1912	Paratyphoid A. Fæcal Acute.	Still in Depôt.	Pyrexia of uncertain origin.
,, ...	Sergt. P. ...	11091 ...	Military Works	Murree—26th June 1912.	10th September 1912.	Paratyphoid A. Urinary Acute.	Returned to duty.	Enteric Fever.
,, ...	Pte. A. ...	10132 ...	Highland Light Infanty.	Lucknow—2nd October 1912.	6th November 1912 to 9th January 1913.	Paratyphoid A. Fæcal Acute.	Ditto ...	Paratyphoid A. Fever.
Wellington	Pte. W. ...	7901 ...	1st Oxford and Buckinghamshire.	Wellington—23rd September 1911.	11th November 1911 to 8th March 1912.	B. Paratyphosus A. Fæces.	Invalided to England.	Enteric Fever.
,, ...	L.-Cpl. D. ...	6380 ...	2nd East Lancashire Regiment.	Mhow—1st December 1912.	3rd March 1913 to 8th March 1913.	B. Paratyphosus A. Urine.	Ditto ...	Paratyphoid A. Fever.
,, ...	Br. S. ...	55256 ...	2nd Battery, Royal Field Artillery.	Bangalore—17th October 1912.	26th November 1912.	B. Paratyphosus A. Fæces and Urine.	Still in Depôt.	Paratyphoid A. Fever.

Pyrexia of Uncertain Origin.

4. This group is associated intimately with the enteric, paratyphoid and malaria cases. In spite of increased care to secure accuracy of diagnosis we cannot say that finality has been reached or that we have overcome all the difficulties. The number of cases under this heading in 1912 was 1,506 as against 1,914 in 1911 and 2,733 in 1910. Three deaths are recorded in this group. They occurred at Lahore, Lucknow and Rangoon. The first would appear to have resulted from effects of heat as the man was under treatment for but a few days during extremely sultry weather: the Lucknow case died from heart failure supervening on a pyrexia of indefinite nature: the Rangoon case was one of a similar kind. The following table shows the essential facts under this and the next heading for the last three years:—

Divisions.	Admissions per 1,000 of strength.					
	Pyrexia of uncertain origin.			Malaria.		
	1910.	1911.	1912.	1910.	1911.	1912.
1st (Peshawar)	29·6	54·0	18·0	421·8	196·0	192·4
2nd (Rawalpindi)	40·8	14·2	16·5	128·4	86·7	94·0
3rd (Lahore)	54·6	39·6	33·5	156·1	94·8	80·0
4th (Quetta)	7·4	10·3	9·4	130·4	129·2	103·3
5th (Mhow)	7·3	5·2	4·8	206·8	168·5	167·7
6th (Poona)	42·5	20·2	22·4	102·3	95·5	84·9
7th (Meerut)	28·0	9·6	2·8	191·5	75·2	37·8
8th (Lucknow)	53·7	56·3	38·8	64·6	48·0	31·5
9th (Secunderabad)	21·8	13·4	3·1	32·0	48·0	47·7
Burma	82·6	90·2	109·2	53·9	41·8	91·8
Aden Brigade	88·5	35·7	31·4	74·1	34·7	26·0

Malaria.

5. Under this head we are able to record 680 fewer admissions than in 1911. There were, however, twelve deaths as against only six in the previous year. The question of malaria prevention was discussed last year and there is nothing to add. Until the use of mosquito nets by troops is general, it is unlikely that we shall obtain any great reduction in malaria prevalence. The Government of India have definitely decided to incur no expense in providing nets for soldiers other than in a few selected places, the provision, therefore, of these protectors for the men depends entirely upon regimental initiative. We are able to record a slow but steady increase of the use of nets by soldiers in barracks. Many are provided regimentally and a few are private purchases by the men themselves. There has been no abatement of active anti-malarial measures in all garrisons by means of mosquito brigades. Concurrent with these activities, the administration of quinine has been steadily pressed and the combined influence of both these measures is slowly bearing fruit.

6. The following table summarizes the facts as to this pyrexia, malaria, and pyrexia of uncertain origin :—

Sandfly fever.

Year.	Ratio per 1,000 of strength.					
	Pyrexia of uncertain origin.	Malarial Fevers.			Sandfly Fever.	
	Admissions.	Admissions.	Constantly sick.	Invalids sent Home.	Admissions.	Constantly sick.
1910	37·7	132·0	4·26	·07	7·1	·13
1911	26·4	90·2	2·96	·10	19·2	·38
1912	21·2	82·4	2·96	·04	30·5	·58

The admissions for sandfly fever rose in 1912 to 2,163 as compared with 1,393 in 1911. This increase must be read in connection with the reductions under pyrexia of uncertain origin and malaria. It is largely a matter of accuracy in diagnosis. The prophylaxis of this disease is associated intimately with that of malaria, and until all troops make a systematic use of netting during the night there is bound to be a considerable amount of temporary sickness from sandfly fever. Fortunately, it is associated with no mortality and, in its most aggravated form, is limited largely to a few stations, more especially Peshawar, Meerut, Nowshera and Rawalpindi.

Plague.

7. We have to record ten cases of this disease with five deaths. Two cases and one death occurred at Meerut, one non-fatal case at Jubbulpore, and seven cases with four deaths at Secunderabad. Considering the extent to which plague is still prevalent in India, it is remarkable that no greater incidence of the infection has occurred among European troops.

Cholera.

8. Cholera was the cause of 19 admissions and 10 deaths. This is a lower incidence than in 1911. One series of six cases with four deaths occurred at Jhansi. The infection seems to have been conveyed by barrack menials, who themselves were in contact with the disease by resorting to the city. Three cases occurred at Poona with one death : the disease was prevalent in the adjacent bazaars. At Meerut three cases with one death are reported. All these cases occurred on the same day in the section hospital. Infection was undoubtedly contracted in hospital, but how, is not apparent. The disease existed in the locality but no evidence is available as to how it was conveyed to these three men. There was no case among the menials nor suspicious symptoms among any of the other patients. The other seven cases occurred at Attock, Rurki, Fort William, Cawnpore, Secunderabad and Ahmednagar. In all these cases there was a definite history of recent visits to local bazaars.

Small-pox.

9. Small-pox accounts for seventeen cases and three deaths. This is a much higher incidence than we have had for some years. The deaths occurred at Ferozepore, Landour and Bellary. The fatal case at Bellary showed no marks of previous vaccination—the man had been unsuccessfully vaccinated in 1908—the two fatal cases at Landour and Ferozepore had been re-vaccinated successfully in 1894 and 1908, respectively. Of the 14 non-fatal cases, all except one (he had marks of vaccination in infancy) had been successfully re-vaccinated.

The source of infection in all these cases was difficult to trace, but as small-pox was prevalent in all the bazaars and cities, it is reasonable to assume infection through barrack menials.

More vaccinations were performed during 1912 than in the preceding two years. There were ten primary vaccinations and 8,514 re-vaccinations among the men. Of the primary cases, four were successful, that is, three gave one vesicle and one three vesicles. Of the re-vaccinations, 91 gave four vesicles, 1,015 gave three vesicles, 1,271 gave two vesicles, 621 gave one vesicle, 912 gave merely papules surrounded by an areola, and 4,604 were failures. The following table gives the essential figures as to small-pox and vaccination during recent years :—

INDIA.

Year.	Small-pox.		Number of Primary and Secondary Vaccinations.
	Admissions.	Deaths.	
1908	53	2	15,956
1909	19	1	12,773
1910	3	...	7,346
1911	1	...	6,726
1912	17	3	8,524

Measles. Measles gave 16 admissions but no death.

Scarlet Fever. Scarlet fever gave one admission but no death.

10. Dengue accounts for no less than 364 admissions, but no death. The incidence of this disease is much higher than in former years. Most of these cases were reported from Calcutta and Madras, where the disease was peculiarly prevalent amongst Indians. They represent a class of case in which precise diagnosis is open to some difficulty and needs to be considered in association with the large group of pyrexias of uncertain origin. There is some reason to think that the infection is connected with the bites of small insects of the sandfly group. The matter has been and is the subject of much microscopic investigation by medical officers, but so far no definite knowledge has been obtained.

Dengue.

11. Rabies does not appear to have occurred during the year, but 81 cases are reported as having undergone anti-rabic treatment. There was no death.

Rabies.

12. We have had 5 cases of Kala-azar. Two were discovered at Naini Tal in the Enteric Depôt, the men having been sent there for paratyphoid fever. The three other cases occurred at Dinapore, Dum Dum and Chakrata; all were invalided.

Kala-azar.

13. Beri-beri is not reported this year, but we have 60 cases with two deaths shown under the head of multiple neuritis. These are mainly from Calcutta and other stations in Bengal. The fatal cases died of cardiac failure. This group of cases is still associated with obscurity, but the evidence is slowly accumulating which suggests that the symptoms are due to a disturbed metabolism, in which the essential factor is the absence from the dietary of what may be called an activator. Too little is yet known concerning this chemical substance in food, and as regards cases in the army, we recommend suspension of judgment or the expression of dogmatic opinions. What little is known suggests the absence from certain foods of an essential principle or activator; why this should occur is not known, but the facts indicate the consistent occurrence of these cases in certain areas where climatic conditions favour

Beri-beri.

a rapid degradation of food-stuffs. The whole question is under critical scrutiny, but the problem is too complicated to justify either hasty conclusions or action based on those conclusions. The symptoms, in the majority of cases, are not explicable on the assumption of an alcoholic origin.

Dysentery and liver abscess.

14. Dysentery and liver abscess show a reduction in incidence. There were 371 admissions for dysentery with 11 deaths, as against 560 cases with 19 deaths in 1911. The figures for liver abscess are 47 cases with 23 deaths as compared with 71 cases and 33 deaths in the previous year. The comparative incidence of these diseases in recent years is shown in the following table :—

INDIA.

Year.	Ratio per 1,000.			
	Dysentery.		Liver Abscess.	
	Admissions.	Deaths.	Admissions.	Deaths.
1908	14·4	·42	1·7	·80
1909	11·2	·25	1·4	·48
1910	7·7	·23	1·0	·48
1911	7·7	·26	1·0	·46
1912	5·2	·15	·7	·32

Poisoning.

15. An unusually large number of cases of poisoning have been admitted. Thus we find 20 cases arising from various forms of fish, meat and vegetable degradation, 4 from mushroom eating, 1 from horse bite, 1 from mauling by a leopard, 1 from a jackal, 9 from poisonous stinging insects, 1 from overdose of quinine, 1 from arsenic, 1 from oxalic acid, 2 from corrosive sublimate, 2 from chloroform and 2 from snake bite. Of the fatal cases, 1 from cyanide of potassium was suicidal, 1 from quinine was due to an overdose taken by a man working in an ærated water factory. The quinine was a concentrated preparation used in making " tonic " water, and the man took some 220 grains. Two fatal cases followed food consumption, one fatal case resulted from snake bite and two fatal cases resulted from chloroform vapour. In these last no blame or want of care is to be attributed to the anaesthetist.

Venereal diseases.

16. The figures for 1912 indicate a checkin that steady decline of the prevalence of venereal diseases which has been a satisfactory feature of the statistical reports in recent years. The incidence of these diseases in the various Divisions of the European Army in India, during the last five years is shown in the following table, on a basis of admissions per 1,000 of strength.

VENEREAL DISEASES.

Division.	1908.	1909.	1910.	1911.	1912.
Peshawar	41·1	34·3	38·5	36·0	51·6
Rawalpindi	44·6	52·4	34·2	33·9	34·2
Lahore	55·9	49·7	53·5	44·0	53·0
Quetta	42·5	56·8	41·8	50·0	39·1
Mhow	71·2	75·0	57·1	45·2	48·5
Poona	85·6	68·1	74·5	72·4	64·1
Meerut	56·6	73·6	63·0	49·2	48·1
Lucknow	79·2	80·7	70·3	63·7	72·7
Secunderabad	108·2	84·1	77·9	70·9	74·7
Burma	115·2	107·9	74·4	82·9	84·0
Aden	20·9	38·4	27·9	44·6	49·8

The total admissions for all forms of venereal disease during 1912, number 3,943 cases as against 3,842 in 1911. In respect of component groups, there is a decrease of 0·3 per 1,000 for syphilis, but increases of 0·4 and 2·3 per 1,000 admissions, respectively, for soft chancre and gonorrhœa. This is equivalent to a total increase of 2·4 per 1,000 admissions to hospital for all forms of venereal disease. There is, however, a decrease of 36 cases of syphilis contracted during the year and a decrease of 12·68 in the average number constantly sick for all forms of venereal disease. The admission rate for all forms of venereal disease during recent years is summarized in the following table, the ratios being in all cases per 1,000 of strength :—

INDIA.

Year.	Syphilis.	Gonorrhœa.	Soft Chancre.	All forms of Venereal Disease.
1908	15·8	37·9	16·1	69·8
1909	16·3	37·7	13·9	67·8
1910	14·5	33·5	10·9	58·9
1911	11·9	31·7	9·5	53·1
1912	11·6	34·0	9·9	55·5

The fifteen garrisons with a strength of not less than 200 men which furnished the highest rates for admission from all forms of venereal disease during 1912, were Mandalay, Madras, Colaba, Fort William, Darjeeling, Naini Tal, Muttra, Dinapore, Dum Dum, Jullundur, Rangoon, Bangalore, Shwebo, Jutogh and Delhi.

The invaliding rate from this class of disease shows a fall. This favourable feature is due to improved methods of treatment. The invaliding rates during recent years is shown in the following table :—

Year.	SYPHILIS.				GONORRHŒA.			
	Invalids sent Home.		Invalids finally discharged.		Invalids sent Home.		Invalids finally discharged.	
	Actual.	Ratio per 1,000.	Actual.	Ratio per 1,000.	Actual.	Ratio per 1,000.	Actual.	Ratio per 1,000.
1908	59	·86	33	·48	15	·22	9	·13
1909	26	·36	16	·22	8	·11	4	·06
1910	18	·25	17	·23	7	·10	7	·10
1911	10	·14	11	·15	4	·06	2	·03
1912	9	·13	...	...	2	·03	...	...

The following table is instructive as showing the incidence of venereal diseases, according to arms of the service:—

Year.	Venereal Diseases: Admission Ratio per 1,000.		
	Cavalry.	Artillery.	Infantry.
1908	59·6	58·8	75·4
1909	55·1	69·7	72·9
1910	48·2	58·7	64·3
1911	48·9	53·8	57·3
1912	56·1	52·4	60·7

The treatment of syphilis has been prosecuted on the most modern lines, mainly by salvarsan in conjunction with after treatment with mercury and the iodides. No untoward results occurred, which is most satisfactory. All junior officers of the Royal Army Medical Corps, on arrival in India, undergo a short refresher course of instruction in the technique employed in the intravenous injection of this drug and by this means are familiarized with the apparatus issued for that purpose to Indian hospitals. They are also made thoroughly *au fait* with the diagnosis of syphilis by the Wassermann reaction, the routine employment of which constitutes an important aid in the observation of the subsequent progress of these cases. Two deaths are recorded as attributable to syphilis. One occurred at Barian and was due to existence of a cerebral gumma. The other case was a sergeant-instructor of volunteers: he died in the civil hospital at Madras where his death is reported to have been due to a similar brain lesion. A case of death resulting from septicæmia and cardiac failure following acute gonorrhœal cystitis is also reported from Peshawar.

Invaliding.

17. The returns under this head are the lowest on record and testify to the success of our recent policy in sending as many men as possible to the hills during the trying months of the hot season. The benefits accruing from this policy are apparent, not only in the lowest invaliding rate but also in the lowest death rate, both of which are outstanding features for 1912. The following table shows the number of cases invalided to England for the more important diseases during the period 1903-1912:—

Table showing the number of cases invalided to England for the more important diseases during the years 1903-1912 with the actual totals.

	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Syphilis	191	175	75	120	76	59	26	18	10	9
Malaria	244	259	126	136	274	62	76	5	7	3
Valvular disease of heart and disordered action of the heart	211	317	171	222	177	96	71	90	57	61
Debility	213	189	151	255	177	70	20	14	5	13
Tubercle of the lung	91	223	116	91	166	72	65	71*	55	47
Dysentery	59	85	37	59	49	31	16	9	9	9
Insaneness	78	115	65	64	69	53	50	32	40	28
Local injuries	62	71	51	66	62	80	35	35	39	42

* Including a case in which lung as well as peritoneum were affected.

	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Rheumatic fever (including gout, osteo-arthritis, etc.) ...	53	44	48	40	30	27	7	4	12	14
Enteric fever	46	93	52	115	86	21	9	4	3	6*
Diseases of nervous system other than epilepsy and mental...	59	56	43	59	57	44	25	29	23	36
Perforation of membrana tympani	34	45	36	51	61	24	23	11	12	15
Diseases of respiratory system	28	64	24	39	50	30	12	16	15	9
Epilepsy	34	53	38	42	33	36	27	25	30	24
Abscess of liver	46	51	49	67	39	31	17	14	2	5
Hepatitis, including cirrhosis	32	51	14	36	21	23	4	9	4	5
Diseases of the eye other than amblyopia and errors of refraction.	32	40	29	29	29	20	16	14	12	16
Diseases of the digestive system other than hepatitis abscess, abscess of liver, cirrhosis of liver, hernia and caries of teeth.	80	80	51	56	41	24	11	11	14	9
Bilharzia hæmatobia	158	71	23	10	4	2	3	1	1	1
Diseases of the ear other than perforation of the membrana tympani.	32	39	28	38	54	44	26	36	50	29
Diseases of the circulatory system other than valvular disease of heart and disordered action of heart and varix.	32	26	23	32	20	18	2	15	10	4
Hernia	15	43	19	15	9	10	3	2	3	1
Amblyopia and errors of refraction	20	35	19	23	41	20	10	19	13	6
Gonorrhœa	21	24	8	11	21	15	8	7	4	2
Varix	15	9	5	13	9	6	2	1	5	...
Caries of teeth	6	38	14	38	31	9	3	3	6	...
Beri-beri	4	17	25	60	5	5	3	2	1	...
Anæmia	5	3	8	5	7	5	1	...	1	1
Total all causes ...	2,062	2,506	1,506	1,991	1,766	1,074	648	562	512	474

*Includes 5 from Paratyphoid A.

18. The general health of officers cannot be considered as having been good in 1912. We have had 1,362 admissions for disease in 1912 as compared with 1,365 in 1911. The chief causes of illness have been enteric and paratyphoid fevers, malaria, sandfly fever, pyrexia of uncertain origin, tonsillitis, diarrhœa and influenza. The following table compares the health of officers generally with that of the men :—

Officers.

Year.	Ratio per 1,000 of strength.					
	Admissions.		Invalids sent home.		Deaths in the Command.	
	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.
1908	647·2	836·2	42·59	15·67	7·87	9·09
1909	638·5	716·9	17·86	9·06	9·58	6·25
1910	572·9	576·5	18·60	7·75	7·19	4·66
1911	582·1	524·7	15·78	7·07	8·10	4·89
1912	597·9	547·9	16·24	6·68	4·39	4·62

As in previous years, there is a marked difference between the invaliding of the two groups. The discrepancy is more apparent than real and may be accounted for mainly by social circumstance. The deaths among officers were 10 as compared with 19 in 1911. The causes of death during the period under review were, one from fracture of spine, one from concussion of brain, one from gunshot wound, one from granular kidney, one from colic, one from syncope, one from fatty degeneration of heart, one from carcinoma, one from tubercle of the lungs and one from enteric fever. There were 13 cases of enteric fever and 2 cases of paratyphoid fever among officers; it is notable that among these only five had been inoculated. The comparative incidence of this disease among the four classes of officers, women, children and non-commissioned officers and men is shown in the following table, the ratios being per 1,000 of strength.

Enteric Fever.

Officers.		Women.		Children.		Non-commissioned officers and men.	
Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
6·6	·44	7·0	1·21	2·0	...	2·6	·39

Women.

19. Compared with some former years, the health of the women has not been good. Both the admission rate and death rate is enhanced. The following are the figures:—

Year.	Ratio per 1,000.	
	Admissions.	Deaths.
1908	719·7	13·53
1909	596·7	7·67
1910	504·7	6·28
1911	495·8	7·30
1912	510·5	9·16

There were 38 deaths among the women as against 31 in 1911. These included 5 from enteric fever, 3 from cholera, 4 from tuberculosis, 3 from valvular disease of heart, 1 from heatstroke, 1 from small-pox, 1 from dysentery, 1 from chloroform vapour and 1 from burns.

For purpose of comparison the following table is submitted. It shows the incidence and death rate prevailing among the women and men in respect of the four

chief groups of disease. Only in respect of malaria and pyrexia of uncertain origin are the figures in favour of the women.

Year.	Admission ratio per 1,000 of strength.							
	Enteric Fever.		Dysentery.		Malaria Fever.		Pyrexia of Uncertain Origin.	
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.
1908 ...	14·6	13·3	14·4	10·0	244·6	86·3	74·1	18·4
1909 ...	8·9	10·2	11·2	6·9	202·8	69·5	61·3	28·1
1910* ...	4·6	6·5	7·7	5·3	132·0	34·8	37·7	15·0
1911* ...	3·8	6·4	7·7	7·1	90·2	26·1	26·4	8·0
1912* ...	2·6	7·9	5·2	5·8	82·4	22·4	21·2	10·4

* Including Paratyphoid A. and B.

Children.

20. Taken as a whole, the health of the children in barracks has not been good. Both the admission rate and death rate for all causes are higher than last year. In 1912 the former was 389·6 and the latter 33·49; the corresponding figure in 1911 were 370·6 and 30·33, all per 1,000. There has been a reduction in the prevalence of measles, dysentery and enteric fever, but an increase in respiratory diseases and small-pox. The following table shows the essential facts as to this class:—

Year.	Admission ratio per 1,000 of strength.				
	Small-pox.	Measles.	Enteric Fever.	Dysentery.	Respiratory Diseases.
1908	1·4	32·7	3·6	8·1	38·8
1909	1·0	25·2	5·8	7·4	53·9
1910	*Nil*	12·1	3·3	6·1	41·2
1911	·1	66·6	4·3	5·7	31·9
1912	2·1	19·2	2·0	3·1	49·5

SECTION II.

INDIAN ARMY.

(Contributed by the Director, Medical Services in India.)

21. There has been no unusual ill-health amongst Indian troops during the year. The average present strength including those on duty outside India was 132,232 as compared with 131,213 in 1911. The marginal table gives concisely the rates for the years 1912 and 1911 and of the previous five years. The admission rate is somewhat higher than in 1911, and is probably accounted for entirely by greater attention being paid to what have been previously reckoned as negligible complaints, such as fever of uncertain origin (3 days fever), sandfly fever and diarrhœa, which used to be treated in the lines but are now admitted to hospital. The death rate as shown is rather lower than in 1911, and if the deaths that occurred while on sick leave and furlough are taken into account, which is not the case in the table, the difference is more marked, 5·66 in 1912 as against 6·78 in 1911.

India.

Indian troops.	All causes. Ratios per mille.		
	1906-10.	1911.	1912.
Admissions	628·2	515·8	547·5
Constantly sick,	21·9	19·8	20·1
Deaths ...	6·14	4·48	4·42
Invalids	6·07	4·43	4·61

The following table shows the death rates per 1,000 among Indian and British troops since 1880 compared with that of British troops serving in India. As the first column is calculated on present strength, *i.e.*, shows the monthly fluctuation due to men on furlough, it cannot be considered as so nearly comparable as the second column is to the third relating to European troops, as the present strength of the latter of necessity shows no appreciable difference from enrolled strength on which the figures given in the second column are calculated. From 1904 to 1908 the decrease in mortality in the two armies was decidedly more noticeable in the Indian army than in the British and sufficiently too from 1908 to be worthy of record; now, however, the actual ratio of advance has been reversed and the lead has been unmistakably given to the latter.

Indian Troops.			British Troops.	Indian Troops.			British Troops.	Indian Troops.			British Troops.
Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.	Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.	Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.
1880 ...	39·22	41·12	24·85	1891 ...	15·44	19·34	15·89	1902 ...	11·16	15·01	14·68
1881 ...	19·24	22·62	16·86	1892 ...	14·97	18·67	17·07	1903 ...	10·04	16·62	13·05
1882 ...	12·24	14·76	12·07	1893 ...	10·29	12·81	12·61	1904 ...	8·46	12·08	10·83
1883 ...	11·76	14·31	10·88	1894 ...	10·76	13·59	16·07	1905 ...	8·09	9·59	10·05
1884 ...	10·50	12·22	12·56	1895 ...	11·60	15·71	15·26	1906 ...	6·57	8·58	10·43
1885 ...	13·67	16·09	14·55	1896 ...	10·20	12·57	14·84	1907 ...	6·27	8·51	8·18
1886 ...	13·27	19·46	15·18	1897 ...	13·12	14·90	22·93	1908 ...	7·41	8·49	9·78
1887 ...	11·68	18·17	14·20	1898 ...	11·07	13·33	20·05	1909 ...	5·62	6·42	6·25
1888 ...	12·84	16·14	14·84	1899 ...	10·70	14·50	12·75	1910 ...	4·89	7·12	4·66
1889 ...	12·94	16·19	16·60	1900 ...	14·04	18·57	14·62	1911 ...	4·48	6·78	4·89
1890 ...	13·91	18·64	13·84	1901 ...	10·68	13·89	12·38	1912 ...	4·42	5·66	4·62

The chief causes of sickness in order of importance were malaria, pyrexia of uncertain origin, respiratory diseases and dysentery, and the chief causes of death were pneumonia, enteric fever, malaria and tubercle of the lungs.

There were 609 invalided as compared with 581 in 1911, chiefly for tubercle, anæmia, debility and venereal disease.

In comparison with European troops the Indian troops showed much less tendency to suffer from hepatic complaints and venereal disease, but on the other hand a greater proneness to malaria, tubercle of the lungs, pneumonia, respiratory diseases and dysentery.

Northern and Southern Armies; Divisions.

22. There was a greater amount of sickness in the Northern than in the Southern Army—the admission rate of the one showing an excess of 128 per 1,000 over the other. This may be looked upon as normal, but the death rate has not, as has usually been the case, followed this course as the Northern Army showed a decrease over the other of '33 per 1,000, mainly due to less mortality from cholera and plague.

The Divisions of the Army showing the least favourable death rates were those of Poona, Meerut, Lahore and Secunderabad. The chief causes of mortality in the Poona Division were pneumonia, enteric fever and cholera; in the Meerut and Lahore Divisions they were pneumonia, enteric fever and tubercle of the lungs; and in the Secunderabad Division cholera and enteric fever.

The three Divisions with the lowest mortality were Burma, Rawalpindi and Peshawar; in the Burma Division there was a reduction in the mortality rate of 74 per cent. on 1911.

Stations outside of India.

The accompanying table complements to some extent the information given in Table XV*:—

——	Average strength.	Admission rate.	Death rate.
Aden Brigade	862	550	3·48
Persian Gulf	1,117	556	3·58
Colombo and Singapore	1,573	539	7·63
Tien-tsin and Hong-Kong	4,218	451	6·16

The strength of the Aden Brigade varied but little on that of previous years. There was a decided improvement in the health of the troops as shown by the admission and death rates, most marked in Aden proper where the admission rate was 572·2 as against 807·0 in 1911. The chief ascertained causes of sickness were dysentery and respiratory diseases. It will be noticed that the death rate 3·58 in the Persian Gulf was under that for India generally, a great change on the previous year when it was 9·45. The admission rate too showed an appreciable reduction, though at Jask it was very high being no less than 11·30 per mille, the chief factors in this result were dysentery and scurvy.

The sickness generally in the China stations as compared with that in India was considerably less; but the death rate was high both as compared with the general Indian rate and with that of China in 1911. This was due to an increased mortality from respiratory diseases and tubercle of the lungs, especially at Tien-tsin where the death rate rose to 7·47 as against 1·16 in 1911.

Geographical Groups.

23. As regards geographical groups those of Bengal and Orissa and Assam suffered more heavily from sickness than others: the chief cause was malaria.

Stations, Regiments.

24. In 1912, 38 stations in India had an average strength of over 1,000; amongst these the rates of admission were very high in Dera Ismail Khan (1,065), Lahore Cantonment (968), Jullundur (835) and Peshawar (814), and the death rates in Bakloh (10·87), Dehra Dun (10·61), Aurungabad (8·32) and Secunderabad (7·31).

* Standard Table of the Sanitary Commissioner's Annual Report.

The chief ascertained cause of sickness at Dera Ismail Khan, Lahore and Peshawar was malaria. The high death rates at Bakloh and Dehra Dun were due to pneumonia and tubercle of the lungs, at Aurungabad to enteric fever and at Secunderabad to cholera.

The regiments which suffered most severely from sickness during the year were the 1-2nd Gurkha Rifles at Dehra Dun, the 32nd Lancers at Jubbulpore, the 34th Poona Horse at Aurangabad and the 41st Dogras at Cawnpore and Bareilly. The admission and death rates of these regiments were as follows :—

	Admission rates.	Death rates.
1-2nd Gurkhas, Dehra Dun	391·1	16·30
32nd Lancers, Jubbulpore	480·4	15·69
34th Poona Horse, Aurangabad	699·8	15·59
41st Dogras, Cawnpore and Bareilly	306·5	14·66

Cholera.

25. There were 85 cases of cholera with 38 deaths as against 16 and 14, respectively, in 1911. Of these 57 cases with two deaths were returned from Secunderabad (28) Cawnpore (18) and Baroda (11). In the case of Secunderabad the origin of the infection was not discovered—the disease was, however, prevalent in the city. In the other two outbreaks the infection was brought by sepoys returning from leave: in the Cawnpore case from a village near that city, and in the other probably from a railway station in the Poona district where there was cholera. In the Baroda outbreak the sepoy arrived on the 15th May—he was six hours ill in the lines before coming into hospital on the afternoon of the 16th and in the meantime had used and fouled several of the regimental latrines. A sweeper woman and two sweeper children were the first to contract and die of the disease, and it was thought that the contagion was taken from the latrines to the lines, probably on the men's feet and hands. The latrines were vacated and cleansed and trenches used in their stead, with the result that there was no further case. The wells used in the lines were closed and the men made to drink pipe water only, as a precautionary measure, but it was not thought that the water was contaminated, as had it been, the disease would have been much more extensively prevalent and would not have been confined to one wing.

Small-Pox.

26. The total number of admissions from small-pox was 64 as against 36 in 1911. There were only 3 deaths. No individual regiment returned more than four cases and the disease was not confined to any particular portion of the army.

Malaria.

27. There were 11,752 admissions and 35 deaths from malaria as compared with 13,778 and 55, respectively, in 1911. The admission and death rates fell from 105 per 1,000 to 89 and from ·42 to ·26, respectively. The cause for the reduction may be mainly attributed to a more favourable year, though no doubt the antimalarial measures that are being strenuously carried out in all cantonments played some part.

The heaviest admission rates (in stations where the average strength was above 150) occurred in Port Blair (530 per 1,000), Dera Ismail Khan (404), Alipore (370), Delhi (368) and Fort Dufferin (354).

The 27th and 72nd Punjabis at Dera Ismail Khan, returned 293 and 503 cases, respectively. This station is threatened by the Indus and the question of removing the cantonment to Tank is under consideration.

The 40th Pathans, which furnished 270 admissions from malaria at Alipore, came from Dera Ismail Khan early in the year where it had had 914 admissions in 1910 and 380 in 1911 due to malaria. In 1911, though the cases were

fewer the type had been much more severe necessitating prolonged treatment in hospital : of the number examined 78 were of the benign and 94 of the malignant tertian variety. During the year under report, of those cases of which the blood was microscopically examined, 37 were of the benign and 21 of the malignant tertian type. In December, it was found that close on 400 men suffered from enlarged spleen. These facts would seem to indicate that Dera Ismail Khan, and not Alipore, was responsible for the large amount of sickness from malaria in this regiment. It is important to note that the whole regiment slept under mosquito nets and that the prophylactic use of quinine was commenced in June and carried on throughout the year.

At Port Blair, the detachment of the 93rd Burma Infantry suffered severely whilst out in musketry camp, due it is stated, to the presence of an anopheline infected nullah 50 feet below the site on which the camp was pitched. Steps were taken to clean the nullah and to destroy the larvae of the mosquito, and on return to headquarters at Ross Island the epidemic practically stopped.

At Delhi, the 33rd Punjabis had 353 admissions, and of those cases of which the blood was examined microscopically, 78 per cent. were due to the presence of the benign and 20 per cent. to the malignant tertian variety of the parasite. The cavalry regiment (11th Lancers) stationed at Delhi suffered relatively very little. There can be no doubt but that the excessive amount of sickness from which the infantry suffered was due to the position of their lines at Daryaguhj near the swampy *bela* of the Jumna and to the proximity of a crowded malaria-stricken population in the neighbouring bazaar.

The 91st Punjabis located in Fort Dufferin at Mandalay had 388 admissions from malaria. The previous year had been a bad one for this disease, the regiment as a whole had made a good recovery and there would not probably have been an unusual amount of malaria in 1912, but for the fact that two double companies were out in camp at Sitha in the hills near Maymyo, where owing to a case of measles occurring amongst them they were kept after the rains had broken.

Pyrexia of uncertain origin.

28. There were 5,831 cases and 15 deaths attributed to "Pyrexia of uncertain origin" as against 4,066 cases and 11 deaths in 1911. As this term includes all cases of fever not diagnosed, it would seem of little use discussing the question of location or prevalence except with a view to accentuating the necessity of increased research into the origin of the different diseases included in it. In Drosh, 430 cases were returned under this heading from the 2-6th Gurkha Rifles, 365 of which the medical officer attributed to sandfly fever, and similarly the medical officer, 53rd Sikhs at Jullundur, 428 cases. Captain Woods, medical officer, 53rd Sikhs, describes this disease as lasting 2 to 8 days accompanied by intense pain in the back, great prostration, headache varying in severity, with slow convalescence and frequent relapses. He says further that evacuation of barracks, change of camp and final departure from the station had no appreciable effect on the incidence of the disease.

The medical officer, 94th Russell's Infantry, Baroda, returned 229 cases with like symptoms. He states that the disease coincided with an invasion by sandflies not previously found in this station. The blood of all cases was examined microscopically for malarial parasites with a negative result.

From the 18th Infantry at Aden 146 admissions were returned which the medical officer described as identical with 7 day fever (Rogers). He believed that bed bugs, which were present in enormous numbers in the barracks, had some causal relation to the disease.

The medical officer, 91st Punjabis at Fort Dufferin, in an interesting report suggests that the majority of the cases returned under this unsatisfactory heading are really due to malaria in which it had not been possible to discover the parasite microscopically and in which the clinical signs did not warrant a diagnosis of that disease.

Sandfly Fever.

29. In the year under report, there were 1,316 cases of sandfly fever reported as such as against 114 in 1911. The majority of cases returned were reported from Northern India, especially from Meerut (517) and Jullundur (271). The epidemic occurred about

the end of the rains, coinciding more or less with the ordinary malarial season. There would seem to be little doubt but that the increased number of cases returned in 1912 was due mainly to greater attention being paid to slight cases of fever, which in former years would either have escaped notice and would not have been admitted to hospital, or would have been included under other heads.

Enteric Fever.

30. In 1911, there were 302 admissions with 55 deaths, and in 1912, 243 admissions with 62 deaths from enteric fever. As compared with European troops the ratio per 1,000 of strength for admissions was 1·8 Indian as against 2·6 European troops and for deaths ·47 as against ·39. The higher mortality for this disease amongst Indian troops is most probably due mainly to very little protection by inoculation, though to some extent to the want of proper nursing in Indian troops hospitals.

The 1-3rd Gurkha Rifles at Almora reported 13 cases with 3 deaths; out of these 5 were contracted at Almora and 6 at Naini Tal.

The 34th Horse at Aurungabad had 12 admissions and 4 deaths. The whole regiment was inoculated on the outbreak of the disease. The infection was believed to be due to the water supply.

From Secunderabad the 6th Jats reported 12 cases and 3 deaths. It was thought, however, on a diagnosis being made that others, returned as pyrexia of uncertain origin, had been mild cases of the disease. It seems that owing to the cantonment water supply being cut off, this and other regiments had to use wells up till then out of use, and as a result it was thought the infection was probably due to this, though the water had been boiled before issue.

The 59th Scinde Rifles, quartered at Kohat, had 11 cases and 1 death. Captain Husband, I.M.S., the medical officer in charge of the regiment, after an exhaustive analysis of all likely causes, believed the outbreak to be most probably due to the water of a polluted stream that runs through the lines and is used by the men for washing purposes when resorting to mosques and temples situated on its banks.

The 116th Mahrattas at Jhansi had 9 cases and 1 death. The origin was attributed to a sepoy who was admitted to hospital after his return from leave from the Deccan, as 5 of the cases that followed had arrived at the same time and had been with him in the segregation camp: the actual infection was thought to be by flies.

Dengue.

31. There was a great increase in cases reported as due to dengue—398 cases as against 2 in 1911. The regiments mainly affected were the 40th Pathans (273) and the 75th Carnatic Infantry (48) at Calcutta and the 2-10th Gurkha Rifles (34) at Takdah. The medical officer of the 40th Pathans, Captain Kennedy, I.M.S., in a full and convincing report makes out a good case for his diagnosis of the disease; there is, however, considerable doubt as to whether the cases reported from Takdah were of the same nature. The actual cause of the disease was not identified—it was thought in Calcutta that a culex variety of mosquito might be the medium of infection—this could not have been the case at Takdah as the insect is not found there.

Mediterranean fever.

32. There were 65 cases of mediterranean fever with 3 deaths as against 24 cases and 3 deaths in the previous year. The 10th Lancers at Jullundur (19 cases, 2 deaths) the 28th Punjabis (15 cases) and the 37th Lancers (14 cases, 1 death) both at Lahore, furnished 48 out of the 65 cases and 3 deaths. The epidemic amongst the 10th Lancers commenced at the end of 1911 in which year there were 13 cases amongst sepoys and 7 amongst followers: the outbreak was then chiefly amongst Mahomedans. Goat's milk was used in all these regiments but in no case could the disease be traced to a goat. The medical officer of the 37th Lancers had the blood of a large number of horses, cows and goats examined with negative results, except as to one cow whose blood gave agglutination up to 1 in 400—the micro-organism was not, however, isolated from its milk. It was elicited that the milk of this cow could have been the source of infection in a number of the cases.

33. There were fewer cases of plague; 28 admissions and 18 deaths as against 95 admissions and 35 deaths in 1911. A very considerable amount of inoculation against the disease, and especially where it was present, was done, and in one regiment affected, the 105th Mahratta Light Infantry at Poona, (returning 5 cases and 4 deaths) all sepoys, followers, women and children were inoculated twice in the year.

Plague.

34. There were 149 cases of scurvy of which number the 7th Rajputs (22) in the Persian Gulf, the 120th Rajputana Infantry (21) at Belgaum and the 18th Infantry (21) at Aden, furnished 64 cases. There was a difficulty in obtaining a supply of vegetables both in the Gulf and at Aden, the potatoes on which the troops relied principally at Jask having to be obtained from Karachi, and then were not always available; nor could fresh milk be obtained.

Scurvy.

35. As to tubercle of the lungs the ratios per 1,000 of strength were as a whole much the same. The table below will show that there was during the year some slight increase in mortality from this cause.

Tubercle of the Lungs.

TUBERCLE OF THE LUNGS. RATIO PER 1,000.

Year.	ARMY OF INDIA.		GURKHAS.		EXCLUDING GURKHAS.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1901	4·2	·84	13·1	3·95	3·4	·57
1902	4·3	·80	15·6	4·24	3·2	·47
1903	5·9	·68	28·9	2·88	3·3	·44
1904	3·9	·51	10·6	2·66	3·2	·28
1905	3·1	·50	6·1	1·58	2·7	·37
1906	2·5	·52	5·2	2·41	2·2	·29
1907	2·5	·33	4·8	1·03	2·3	·24
1908	3·0	·42	5·0	1·43	2·7	·28
1909	2·3	·39	4·0	1·33	2·1	·26
1910	2·4	·19	3·6	·50	2·3	·15
1911	2·1	·21	3·6	·70	1·9	·14
1912	2·0	·24	4·1	·84	1·7	·16

36. There was less pneumonia in the army, 6·6 admissions per mille and ·83 deaths, as compared with 7·5 and ·98 per mille, respectively, in the previous year.

Pneumonia.

The stations principally affected were Abbottabad (41 cases and 6 deaths), Lansdowne (24 cases and 2 deaths), Quetta (23 cases and 4 deaths), Bombay and Santa Cruz (20 cases and 4 deaths) and Dharmsala (17 cases and 3 deaths). It will be noticed that these cantonments are mainly situated in the hill stations group and the regiments mainly affected were Gurkhas. It should not, however, be assumed from this that Gurkhas are peculiarly prone to pneumonia as they are no doubt to tubercle. The regiments at the Malakand, a very exposed hill station, consisting of the 19th and 69th Punjabis, suffered badly and at Quetta other regiments suffered more than the Gurkhas quartered beside them.

The infantry regiments at Bombay and Alipore were saturated with malaria, the 40th Pathans at the latter place especially so, and no doubt this predisposed the men to pneumonia.

37. There was a marked decrease in the number of cases of dysentery as compared with 1911, 2,208 to 2,971, corresponding more or less with the decrease in sickness from malaria.

Dysentery.

The highest admission rates were reported from Jask in the Persian Gulf (640·0), Baroda (88·7), Santa Cruz (85·8), Bombay (69·5) and Ahmedabad (56·2).

The 7th Rajputs, quartered at Jask with detachments scattered up and down the Gulf, returned 156 cases, mostly occurring at headquarters in three companies. It was suggested that the larger incidence on a limited portion of the regiment was due to the nearness of the cook-houses to the latrines of two of the companies affected, at Ahmedabad before leaving India, producing "carriers" who infected others at Jask through the medium of flies. The disease was considered to be predisposed to by insufficient cooking and to the presence of scurvy in the regiment.

38. There were 1,907 admissions and 7 deaths attributed to venereal disease as against 1,950 admissions and 4 deaths in the previous year. The stations most affected were Hong Kong (160), Dehra Dun (148), Poona (99), Bangalore (76) and Secunderabad (63).

Venereal diseases.

39. Included under the head injuries and poisons are 11 cases of suicide. The means selected to produce death were in 4 cases by gunshot, 2 each by poisoning by arsenic and opium, 1 each by hanging and cut-throat, and 1 by being run over on the railway.

Suicides.

40. The average strength of commissioned British officers with Indian troops in India during 1912 was 1,868, and among them there were 783 admissions to hospital with 8 deaths, as compared with an average strength of 2,014, admissions to hospital 801 and 9 deaths during 1911.

Commissioned British Officers.

The greatest number (105) of admissions was due to malaria. There were 12 cases of enteric fever, 24 of dysentery, 8 of appendicitis, 1 of abscess of liver, 133 of local injuries, 9 of concussion of brain and 4 of small-pox admitted during the year.

The admission and death rates from enteric fever as compared with British troops and officers serving with them are as follows: British officers attached to Indian troops-admission rate 6·4 and death rate ·54; British officers with British troops—admission rate 6·6, death rate ·44; British troops—admission rate 2·6 and death rate ·39. In this connection it is pointed out that inoculation against enteric has not become as general amongst officers as men.

The 8 deaths were due to the following causes: enteric fever 1, pneumonia 1, appendicitis 1, abscess of liver 1, gunshot wound of heart 1, small-pox 1, meningitis 1 and ulceration of intestines 1.

Steps have been taken to obtain more accurate information of the statistics of British officers attached to Indian units, by rendering it easier for civil surgeons to report all cases of illness, which come under their care amongst these officers, while on leave or away from their units on duty.

SECTION III.

GENERAL POPULATION.

41. January 1912 exhibited very unsettled weather conditions in north-west India and Lower Burma: over the rest of India the climate was drier than normal. In February, on the other hand, the rainfall was in defect all over the north of the Peninsula, the usual area of winter rains, whereas in Central India the rainfall was generally in excess. Temperature and humidity were approximately normal in most divisions of India during these two months in spite of the unusual distribution of the rainfall.

Meteorology, crops and general conditions.

The hot weather months, March to May, were characterised in the extreme north of India by the inruption from the west of a series of disturbances of the cold weather type. Though these did not result in much rain, they delayed appreciably the establishment of hot weather conditions. There were no signs of the monsoon during May on the west coast of the Peninsula. The rainfall in the east of the Peninsula was in defect. A short spell of exceptionally hot weather was experienced in the Punjab, Sind and Rajputana in May.

The monsoon was late in becoming established, but the rain it brought differed from the normal by less than 20 per cent. over the greater part of the country. The rainfall of the whole period, June to September, was 1·7″ or 5 per cent. in defect in the plains of India. This compares favourably with the monsoon period of 1911 when the defect was 4″ or 11 per cent. Temperature and humidity approximated the normal in most parts of India during this monsoon period.

The months of the retreating monsoon, October to December, had a rainfall in the plains of India of 14 per cent. above normal. Humidity, cloud and temperature in most parts of the country showed no important deviations from the normal.

The total rainfall of the year 1912 was approximately normal, the total precipitation having been only 1″ or about 2 per cent. in defect.

From the agricultural point of view the year was a prosperous one. The wheat crop yield was 19·2 per cent. above the average of the preceding five years, though less than that of the record year 1911. The rice crop was also very good except in Bihar and Orissa. Sugar-cane yielded a record outturn, 20 per cent. above the average of the preceding quinquennium.

The year ended with excellent prospects for the spring crops in most parts of the country.

42. The following table gives the number of births and deaths registered in each of the several provinces of British India during 1912.

Births and deaths.

Province	Births.			Total deaths.			Ratio of deaths per 1,000 of population.			Mean death rate during previous five years.		
	Total number.	Ratio per 1,000 of population.	Mean ratio during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.
Delhi	18,105	46·03	38·05	10,023	5,420	15,443	43·74	33·01	39·26	55·34	55·27	55·29
Bengal	1,600,335	35·30	34·83	71,148	1,278,631	1,349,779	24·47	30·14	29·77	24·73	29·31	29·02
Bihar and Orissa	1,458,295	42·52	39·09	35,892	1,027,536	1,063,428	29·97	31·04	31·01	32·34	35·39	35·28
Assam	194,675	32·16	31·90	2,501	149,065	151,566	20·80	25·13	25·04	22·20	27·16	27·06
United Provinces of Agra and Oudh.	2,125,585	45·38	39·36	106,037	1,294,770	1,400,807	34·36	29·56	29·91	47·82	43·12	43·43
Punjab	876,125	45·3	41·5	54,473	460,563	515,036	31·94	26·12	26 63	43·53	42·63	42·71
North-West Frontier Province	75,653	37·1	33·7	4,347	43,402	47,749	22·73	23·46	23·39	28·13	27·98	27·91
Central Provinces and Berar ...	671,298	48·24	46·38	58,280	531,005	589,285	47·60	41·84	42·34	41·85	33·29	34·04
Madras Presidency ...	1,245,465	30·9	32·1	138,005	844,303	982,308	28·6	23·8	24·3	28·9	23·3	24·00
Coorg	4,606	26·32	26·35	640	6,073	6,713	64·12	36·81	38·37	53·50	33·39	34·59
Bombay Presidency ...	684,890	34·97	35·53	113,522	569,688	683,210	41·48	33·80	34·88	36·62	27·69	29·20
Burma {Lower	202,197	31·68	33·71	29,874	136,079	165,953	37·23	24·38	26·00	39·69	24·74	26·64
Burma {Upper	114,457	32·96	35·69	13,016	87,520	100,536	44·05	27·54	28·95	42·91	27·69	29·30
Ajmer-Merwara	23,609	47·08	40·35	Not available		19,178	Not available		38·25	Not available		43·02
British India	9,295,296	38·95	38·04	637,758	6,434,055	7,090,991	33·07	29·40	29·71	36·48	35·40	34·28

The birth rate for British India as a whole rose from 38·58 in 1911 to 38·95 per mille for the year under report. Both these figures are slightly a bove the mean ratio for the previous quinquennium, 38·04. As usual, the Central Provinces returns the highest birth rate and Madras, excepting the small province of Coorg, the lowest. The most noteworthy rise is that of the United Provinces where the birth rate was six per mille above the quinquennial average.

The fall of the death rate of British India from 32·01 in 1911 to 29·71, and from a mean ratio for the previous five years of 34·28, is evidence of the comparative healthiness of 1912. It is the lowest death rate that has been recorded since 1901 when it was 29·46. Madras has the lowest death rate and the Central Provinces the highest. The increase of population was most marked in the Punjab and the United Provinces where the excess of births over deaths amounted to the large rates of 18·67 and 15·47 per mille of the population, respectively. In Bombay the birth and death rates were approximately equal. Only in Coorg did the death rate exceed the birth rate.

43. The deaths from the chief causes of mortality are shown in the following table :—

Chief diseases.

Province.	Cholera.		Small-pox.		Plague.		Fevers.		Dysentery and Diarrhœa.		Respiratory Diseases.		All other Causes.	
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
Delhi	406	1·03	517	1·31	97	·25	9,687	24·63	288	·73	3,360	8·54	1,088	2·77
Bengal	95,467	2·10	8,287	·18	1,995	·04	959,193	21·16	27,335	·60	10,353	·22	247,150	5·45
Bihar and Orissa ...	77,023	2·24	2,357	·06	58,324	1·70	644,926	18·80	26,022	·75	6,497	·18	248,279	7·24
Assam	14,303	2·36	4,696	·77	...	...	78,318	12·91	13,241	2·19	3,458	·57	37,550	6·21
United Provinces of Agra and Oudh.	18,894	·40	3,101	·07	114,945	2·45	967,500	20·66	14,986	·32	18,810	·40	262,571	5·61
Punjab	1,833	·09	30,339	1·57	29,805	1·54	275,040	14·22	9,785	·51	41,447	2·14	126,781	6·56
North-West Frontier Province.	1,329	·65	2,017	·99	1	·0005	32,877	16·11	289	·14	1,536	·75	9,702	4·75
Central Provinces and Berar.	34,313	2·46	4,556	·33	19,199	1·38	270,162	19·41	58,825	4·23	44,729	3·21	157,501	11·32
Madras Presidency ...	92,497	2·3	16,094	·4	6,651	·2	306,471	7·6	71,913	1·8	38,616	·9	450,066	11·2
Coorg	...	...	53	·30	9	·05	5,697	32·56	231	1·32	75	·43	648	3·70
Bombay Presidency ...	64,505	3·29	6,331	·32	28,984	1·48	286,321	14·62	57,039	2·91	70,712	3·61	169,318	8·64
Burma { Lower ...	6,013	·94	6,117	·96	2,564	·40	53,287	8·35	9,463	1·48	5,220	·82	83,289	13·05
Burma { Upper ...	1,173	·34	1,842	·53	450	·13	32,680	9·41	2,248	·65	2,527	·73	59,616	17·17
Ajmer-Merwara ...	13	·03	3,050	6·08	13	·03	13,926	27·77	551	1·10	397	·79	1,228	2·45
British India { 1912 ...	407,769	1·71	89,357	·37	263,037	1·10	3,936,085	16·49	292,216	1·22	247,736	1·04	1,854,787	7·77
British India { 1911 ...	354,005	1·48	58,535	·25	733,582	3·07	4,207,356	17·63	253,636	1·06	223,822	·94	1,808,608	7·58

Plague, of all the causes of death, shows the most marked decrease in the mortality rate as compared with the previous year. There were little more than one-third the number of reported deaths from plague in 1912 that there were in 1911, the ratios per mille for British India being 1911, 3·07; 1912, 1·10. All provinces shared in this lessened plague mortality; it was most marked in the Punjab where the death rate fell from 8·89 per mille in 1911 to 1·54 in the year under report.

The deaths reported from "fevers," a comprehensive designation which includes malaria and many other diseases, were fewer than in 1911; the death rates from "fevers" for the last three years were 1910, 19·17 per mille; 1911, 17·63; 1912, 16·49. The progressive nature of this decrease is most satisfactory.

Of other diseases cholera was slightly more prevalent than in 1911 though less so than in 1909. Bombay had the highest provincial cholera death rate, 3·29 per mille; in Bombay cholera was responsible for more than twice the number of deaths caused by plague, whereas in the previous year the plague mortality was seventeen times higher than that due to cholera.

All provinces, except Madras and Coorg, had an increased mortality from small-pox in 1912 as compared with the previous year. Ajmer-Merwara had a small-pox death rate of 6·08 per mille ; the Punjab came second with a ratio of 1·57. Deaths from dysentery and diarrhœa were more numerous than in 1911. The highest death rate was as in the previous year returned for the Central Provinces where this cause of mortality was responsible for a death ratio of 4·23 per mille (3·15 in 1911).

Delhi City.

44. The birth rate of the city was 43·70 per mille. The birth rate was slightly lower than the death rate which was 43·74 per mille. No disease assumed an epidemic form. Cholera caused 103 deaths. September was the month of greatest cholera prevalence when it caused sixty deaths. Plague was responsible for twenty deaths. Rat destruction was carried out most energetically, the average number of rats destroyed per month being 35,000. This indicates a high rat population in the city. Fevers caused 6,588 deaths.

Delhi has an unenviable reputation for malaria; a very thorough malaria survey of the city and its environs has recently been completed. A new Health Department was created during the year for the city and is now under the control of a qualified Indian Medical Service officer. The increased activity in sanitary measures can confidently be expected to bring about in the near future a great amelioration in the unsatisfactory health conditions of the city. The temporary capital on the north of the city and the Imperial city now in course of construction are in the sanitary charge of two additional health officers.

Bengal.

45. The birth rate rose from 34·97 per mille in 1911 to 35·30 in 1912. The excess of births over deaths was approximately 250,000.

Rajshahi heads the list of divisions from the point of view of the birth rate with a ratio of 37·70; it also has the highest death rate 32·70. Considering both births and deaths Chittagong is the healthiest division of Bengal; it had a birth rate of 37·26 and a death rate of 24·66. Five districts had birth rates of over 40 per mille. The highest birth rate in towns was registered in Kurseong, 38·93 per mille. Excluding the Burdwan and Presidency divisions, the birth rates were higher everywhere than in 1911. Of the 112 towns in the Presidency, in 65 the death rate during 1912 was in excess of the birth rate. Excessive infantile mortality (which in Manicktola reached the terribly high figure of 573·99 per mille), the large disproportion of the sexes in some towns and the unusually severe prevalence of cholera and fever were chiefly responsible for this. In 29 rural areas the birth rates were over 45 per mille. Tollyganj which heads the list, returns a birth rate of 106·95 per mille. Fewest births were registered during the five months May to September.

The death rate rose from 26·94 per mille in 1911 to 29·77 in the year under review, 128,199 more deaths being reported than in 1911. All the causes of mortality showed an enhanced death rate. The highest district death rate was returned by Malda, 43·36 per mille. Mortality from all diseases, except small-pox and fever, was larger in urban than in rural areas and in both the death rate from every cause was larger than in 1911.

There was a rise in the infantile mortality rate; 182,258 males and 157,521 females died during the first year of life; these figures represent rates of 220·6 and 203·4 per mille of the births, respectively, as against 205·3 and 184·8 in 1911.

Cholera mortality was considerably higher than in 1911. The disease was very widespread. The total deaths were 95,467 as compared with 67,750 in the preceding year. There was a slight rise in the mortality from small-pox, the mortality was, however, only half the average of that during the preceding quinquennium. The ratios were ·18 in 1912, ·17, 1911 and ·36 average 1907-11.

Excepting Calcutta and its suburbs, Bengal was practically free from plague. There were 1,995 deaths from plague as compared with 1,879 in the previous year. Deaths from "fevers" show an increase both on the previous year's figure

and the average of the preceding quinquennium, the ratios being 21·16, 19·46 and 20·55 per mille, respectively. "Fevers" were responsible for 71 per cent. of the mortality from all causes. In 1912 the percentage was 72. Dysentery and diarrhœa also show an enhanced mortality rate and, as usual, caused a much larger mortality in towns than in rural areas.

During the year 147,559 births and 90,547 deaths were enquired into by the vaccination staff. Of the former 3·09 per cent. and of the latter 2·57 per cent. were found not to have been registered at the thana. In Bakarganj as many as 11·75 per cent. of births and 6·23 per cent. of deaths escaped registration. In Faridpur 9·52 per cent. of births and 9·40 of deaths were unregistered. These figures reveal a very unsatisfactory state of affairs.

City and Port of Calcutta.

46. The death rate in Calcutta during 1912 was 28·1 per mille. Though higher than the rate, 27·2, recorded in 1911, the figure is evidence of the continued improvement in the sanitary condition of the city. The above death rates are of course crude. The characteristics of the population with its excess of males and the large number of young adults amongst the males, are factors of importance in determining the low death rate of the city. Cholera was more severe than in the previous year. Plague, cholera and small-pox accounted for 16·4 per cent. of the total deaths. The death rate was again much higher amongst females (37·0 per mille) than amongst males (23·9 per mille). In this connection it is interesting to note that the death rate from pulmonary turberculosis amongst women is double the corresponding rate amongst men. The Health Officer attributes the excessive female mortality to seclusion in the zenana in which, to secure privacy, ventilation and lighting are so frequently neglected. Plague, cholera and small-pox were all more prevalent than in 1911. The only substantial increase, however, was due to cholera which disease was responsible for 2,244 deaths against 1,860 in 1911. Plague caused 1,831 deaths: the epidemic was at its height in April: there were deaths from plague reported in each month of the year.

The infantile mortality rate was somewhat higher than in 1911 and reached the high figure of 259·6 per thousand births: amongst male children it was 278·9 per mille. High as these figures are they indicate a much better state of affairs than pertained a decade ago: in fact only once during the last twenty years has so low a rate been recorded. Of the infant mortality 36·5 per cent. occurs during the first week of life: premature births, ignorance, and neglect are responsible. The chief reported causes of death during the first week of life are premature birth 371, debility at birth 809, tetanus neonatorum 545. The ignorance and superstition of the native *dhai* is responsible for much. The municipality at present employ only four midwives, one for each 72,000 of the female population!

The birth rate was 21·6 per mille as compared with 21·7 in 1911, the highest rate ever recorded in Calcutta. Estimated on the total female population the birth rate was 67 per mille. Considering only women of the child bearing age, the rate was 126 per mille.

The European seamen arriving in the Port of Calcutta during the year numbered 24,959 compared with 25,065 in 1911, the daily average population being 1,047. There were altogether 14 deaths, *i. e.*, one from "fever" and 13 from "other causes." The average Indian floating population was estimated at 25,843. The number of deaths was 95 against 111, 138 and 193, respectively, during the preceding three years.

Assam.

47. Fairly normal meteorological conditions; a good monsoon, and average crops characterised the year 1912 in Assam.

The provincial birth rate was 32·16 as compared with 31·98 in 1911 which latter figure is practically the average of the preceding quinquennium. The birth rate is higher than that of Madras, equal to that of Burma, but lower than that of all other provinces. The highest district birth rate was returned from Goalpara, 38·77, and the lowest from Nowgong, 27·71. Of towns, Barpeta had the highest birth rate, 55·03, whilst Mangaldai had the lowest, 10·63. The proportion of male to female births was 107. The provincial death rate was 25·04 per mille as against 23·61 in

1911 and 27·06 the mean of the previous five years. Only two other provinces, Madras and the North-West Frontier Province, return a lower rate. The district death rates varied from 38·51 in Darrang to 20·83 in Sibsagar; and the urban rates from 38·10 in Nowgong to 6·84 in Hailakandi. The infantile mortality was 205·6 per mille for males and 187·1 for females. The excess of births over deaths was 7·12 per mille. All districts except Darrang participated in the increase of population.

In Assam, as elsewhere in India, the general accuracy of vital statistics is open to great doubt. In one district where verification was performed with energy, omissions amounting to 13·86 per cent. of the total were detected.

Cholera yielded a mortality of 2·36 per mille as compared with a decennial average of 2·71. The districts of Darrang and Nowgong suffered most; in the latter the Kallang river, which forms the main water supply of the most populous area, is under suspicion as the main factor in the spread of the disease. The mortality from fever in 1912 was slightly less than the average for the preceding decade, 12·94 as compared with 13·31 per mille. The district of Goalpara had the highest mortality rate from fevers, 27·50 per mille. Kala azar was responsible for 1,875 reported deaths as compared with 2,051 in 1911. A kala azar survey is being undertaken by the Deputy Sanitary Commissioner assisted by two assistant surgeons and fourteen sub-assistant surgeons. This has not been completed, but it has been noted that there appears to be a recrudescence of the disease in the Nowgong district and in three sub-divisions on the south bank of the Brahmaputra. The disease also exists in the Sylhet district. The incidence upon children between the ages of 2 and 16 is stated to be marked. The Sanitary Commissioner expresses the opinion from experience in the Golaghat subdivision that, given requisite funds and staff, removal of infected families and persons from infected sites is an effective measure against the disease. The kala azar inquiry that is being carried out under the auspices of the Indian Research Fund Association is at present prosecuting its researches into the etiology of the disease in Assam. There was no case of plague in Assam during the year under report. No other disease calls for comment.

Bihar and Orissa.

48. In all the districts, except those of the Orissa Division, the rainfall in the latter half of September and October was in defect; this affected the outturn of crops adversely. Food-grains rose in price. In spite of these adverse conditions the year was a comparatively healthy one and there were no epidemics attributed to defective rainfall or failure of crops. In other respects the meteorological conditions approximated the normal.

The birth rate, 42·52, was well in excess of the mean of the previous quinquennium, 39·09, and closely approximated that of 1911, 42·87. The highest birth rate was returned from the Palamau district, 49·64, and the lowest from Singhbhum, 31·60. The birth rate in towns was below the district average, being only 29·22 per mille. The towns of Bhagalpur, 17·26, and Puri, 14·57, have conspicuously low birth rates. The highest birth rate in rural circles was returned for Palkot *viz.*, 84·46 per mille. The provincial death rate fell from 35·12 in 1911 to 31·01 in 1912. The mean of the previous five years was 35·28. Saran had a higher death rate, 39·98, than any other district and Singhbhum had the lowest, 19·98 per mille. The death rates in towns varied between 72·43 in Puri to 4·56 in Daudnagar (Gaya) and in rural circles between 40·24 in Saran and 20·02 in Singhbhum. May was the most unhealthy month and November the healthiest.

Verification of vital statistics shows that registration in compulsory areas is on the whole fair: there is much room for improvement, however, in some places. In rural areas 240,029 events were enquired into and 1,961 omissions (·81) per cent. were detected. In the Purnea district omissions were most frequently detected and averaged 14·54 per cent. In Sambalpur 7,448 occurrences were investigated in 321 villages and no omission was detected.

All the chief causes of mortality, except plague and respiratory diseases, exacted a lower toll on the population in 1912 than the average of the previous decade. The plague death rate was 1·7 as compared with 1·6, the average of the years 1902-11, and respiratory diseases were responsible for a death rate of 0·18 as compared with 0·16. "Fevers" had a death rate of 18·8 (21·18

decennial average). The chief outbreak of cholera occurred in Puri in July and August at the time of the annual Car festival. This outbreak was investigated by Major Greig, I.M.S., and a report of some of his most interesting findings were published in the Indian Journal of Medical Research, Volume I, No. 1, July 1913. The use of potassium permanganate for the disinfection of wells is coming more and more into favour amongst the people of certain districts as a means of combating cholera. There is a remarkable fall in the mortality from small-pox in some places, notably in the Puri district. Between the years 1900 and 1908 the average annual number of small-pox cases reported was 1,891. In the year under report no death from small-pox occurred in Puri town and only nine in the district. Plague as usual was most severe in the western districts, Saran, Shahabad and Patna. These districts are adjacent to the United Provinces district of Ballia in which climatic and other conditions are very similar and in which plague appears now to be endemic. The plague mortality rates in these three districts were Saran, 7·54, Shahabad, 6·31 and Patna, 5·31; these rates are all markedly lower than those of the previous year. The people in villages vacate their dwellings on the occurrence of mortality amongst the rats more readily than in former years. Chota Nagpur and Orissa were as usual practically free from plague. Inoculation is not carried out on any considerable scale anywhere, though the results obtained by the Civil Surgeon of Bhagalpur demonstrated the usefulness of the measure as a preventive measure amongst a population exposed to infection.

The United Provinces.

49. In the United Provinces 1912 was a prosperous and healthy year. The birth rate was 45·38 per mille as against 43·84 in 1911 and 39·36, the mean of the previous quinquennium. It was highest in the Jhansi district, 55·34, and lowest in Dehra Dun, 26·61. The average birth rate of towns was 41·45.

The death rate fell from 44·95 per mille in 1911 to 29·91 in the year under report. The provincial birth rate thus exceeded the death rate by 15·47; this increase of population was participated in by 46 of the 48 districts. The two districts in which deaths exceeded births were Ballia (by 8·77 per mille) and Naini Tal (·17 per mille). In the former district plague was responsible, in the latter malaria and cholera. Ballia had a higher death rate than any other district, *viz.*, 47·55 per mille, and Dehra Dun the lowest, 20·87. In towns the death rates varied between 16·82 in Fatehpur and 81·13 in Azamgarh. All causes of mortality had a diminished death roll in 1912 as compared with 1911 with the exception of small-pox. The most marked decreases were fever 340,998, plague 217,356 and cholera 98,795.

The infantile mortality, 206·5 in 1912, was the lowest recorded since 1898 when it was 205·3. This subject is receiving every year increased attention on the part of the local Government. The district rates of infant mortality vary between 278·20 in Hamirpur and 138·32 in Garhwal. In municipalities the infantile mortality averaged 242·16 as compared with 317·28 in 1911. This rate is the lowest recorded in the last thirty years. The rate varied between 321·47 per mille of births in Jhansi, and 84·49 in Bahraich.

Cholera was responsible for a death rate of ·40 per mille as against 2·51 in 1911. The submontane districts Kheri, Gonda, Naini Tal and Almora suffered most. Plague was comparatively mild and caused 114,945 deaths as compared with 332,301 in 1911. As usual the eastern districts suffered most; Ballia heads the list with a mortality rate of 25·39 per mille; then comes Azamgarh 11·64 and Ghazipur 9·48. The western districts escaped more lightly. Muzaffarnagar had a death rate of .1·78 per mille as compared with 19·04, the mean ratio of the preceding quinquennium, and Meerut ·14 against 8·67. The causes underlying the severity of plague in the eastern districts of these provinces was investigated recently by the Plague Commission: their report has not yet appeared. The greater facility with which infection survives the adverse conditions of the off-season in Ballia and the surrounding districts than it does in the more westerly districts, would appear to be one of the chief contributary causes. As usual the Banda district was completely free from plague.

The deaths from "fevers" were 340,998 fewer than in 1911—the rate per mille being 20·66 in 1912, 27·94 in the preceding year and 31·11 the preceding quinquennial average. The rate for 1912 is the lowest recorded since 1893. That many diseases other than malaria are included under the designation

"fevers" is evidenced by the fact that most deaths from this disease were recorded in the month of May, fewest in August. Some interesting investigations on the subject of malaria were undertaken by the chief malarial officer and his staff. Relapsing fever appeared in the Meerut and Bulandshahr districts. The outbreak was made the subject of a special enquiry and reports are awaited. No other diseases call for comment. An increasing activity in sanitary matters characterised 1912 in the United Provinces as in the other provinces of India.

Punjab.

50. The meteorological conditions of 1912 were characterised by good rain in January, an unusually hot pre-monsoon period and a late and defective monsoon. Food-grains were higher in price than in the two previous years. In spite of these adverse conditions, the year was a comparatively healthy one. The birth rate rose from 43·9 per mille in 1911 to 45·3 in the year under report. The rate for the previous quinquennial period was 41·5. The birth rate in districts varied between 53·1 in Karnal and 20·2 in Simla. The average birth rate of towns was 45·0. Coincident with this rise in the birth rate was a fall in the death rate from 34·1 in 1911 to 26·6 in 1912. This death rate is the lowest recorded since 1886 when it was 26·1. Both these figures compare very favourably with the mean of the previous five years which was 42·7 per mille. The highest death rate for districts was reported for Karnal, 33·8, and the lowest for Dera Ghazi Khan, 19·8. The average death rate in towns was 31·94. The infantile mortality rate was 195·10 for males and 194·57 for females. The marked increase in the birth rates is attributed to the comparative freedom from malaria which the Punjab has enjoyed during the last two years. The increase in population amounted to 18·7 per mille, and in every district the birth rate was higher than the death rate (except Simla where the rates were equal). The excess was most marked in the Lyallpur district where it was 28·4 per mille. Every province had a death rate lower than the mean of the previous 5 years. Verification of vital statistics showed only a small percentage of omissions, registration appears to be steadily improving.

Cholera was responsible for a death rate of ·09 per mille which is just half the average rate of the previous 5 years. Small-pox was responsible for 30,339 deaths, the largest annual number since 1896. The mortality was greatest amongst infants. In some districts it is probable that inoculators were responsible, in part, for the spread of the disease. Plague was much less prevalent and much less severe than in the previous year. Only 35,123 deaths were reported as against 198,669 in 1911. The deaths in British districts amounted to 29,850, the balance occurring in Native States. The four most severely infected districts were Ludhiana, Karnal, Gujrat and Ambala where the plague death rates were 6·12, 4·64, 4·55, and 3·44 per mille, respectively. All the other twenty-four districts had ratios of less than 3 per mille. The mean plague death ratios per mille of these four districts for the previous quinquennium were 17·16, 9·51, 16·24 and 13·00. The rate for the whole province was 1·54, as against a preceding quinquennial average of 10·11. These figures show how comparatively mild were the plague epidemics of 1912.

Malaria.—Almost as satisfactory as the decreased prevalence of plague was the lowered death rate from "fevers". In 1912 "fevers" yielded a death rate of 14·22 per mille as compared with 15·33 in 1911 and 21·66 the preceding quinquennial average. In no year since 1877 have "fevers" been responsible for so low a death rate as in the year under report. The highest fever mortality was recorded in December, the lowest in February. The urban fever death rate fell from 16·00 to 11·95 per mille. The prevalence of no other disease calls for special comment.

North-West Frontier Province.

51. Rainfall in 1912 was in slight defect: its seasonal distribution was, however, good. The price of food stuffs rose throughout the province.

The birth rate rose from 35·1 per mille in 1911 to 37·1 in the year under report. This rate is still low for India. The highest district rate reported was for Hazara, 42·5 per mille; the lowest for Peshawar, 31·5 per mille. That the registration of births is very defective is possibly indicated by the fact that the excess of male over female births recorded is extraordinarily high, *viz.*, 123 male for every 100 female births. In the Peshawar district there were 134·9 male births recorded for every 100 female births.

The provincial death rate was only 23·4 per mille as against 23·3 in 1911 and 27·9, the mean of the previous five years. The death rate varied in districts from 27·2 in Hazara to 20·3 in Bannu. Nearly fifty per cent. of the total deaths were those of children under five years of age. The infantile mortality rate, 167, high as it is, is thought to fall far short of a true expression of fact.

There was no indigenous plague in the province during 1912 and only two imported cases were reported. There were outbreaks of cholera in the Hazara and the Peshawar districts, the former being responsible for 630 deaths, a rate of 1·24 per mille, the latter 625 deaths, 0·76 per mille.

Central Provinces.

52. A late, but for the most part well distributed, monsoon helped to bring about a fair outturn of *kharif* crops. A seasonal fall of rain in November made the prospects for the *rabi* crop good. Four districts (Nimar, Amraoti, Akola and Buldana) suffered considerably from defective rainfall. In spite of the generally satisfactory climatic conditions 1912 was an unhealthy year.

The birth rate fell from 49·47 per mille in 1911 to 48·24 in 1912. This rate is stated to be the lowest recorded during the past nine years; it is, however, still higher than the birth rate recorded for any other province of India. The highest district birth rate was for Merwara, 55·68 per mille, the lowest for Chhindwara, 45·0 per mille. For every 100 female births 104·56 male births were recorded. The average birth rate of towns was 40·87. The excess of births over deaths fell from 14·80 per mille in 1911 to 5·90 per mille in the year under report.

The death rate which was 34·67 in 1911 (34·04 the mean of the previous quinquennium) rose in 1912 to 42·34 per mille. This rate is higher than that of any other province in India. The district death rates varied from 27·29 per mille in Mandla to 66·46 in Nimar. Mortality in towns was represented by a death rate of 47·60 per mille as compared with a rural rate of 41·84. September and October were the most unhealthy months of the year and July the healthiest.

Infantile mortality is represented by the appallingly high figure 293·60 per thousand births to which it rose from 245·75 in 1911. The rise is attributable to the greater prevalence and severity of epidemic disease.

The very considerable increase in the death rates of all the chief causes of mortality during 1912 is well shown in the following table reproduced from the annual report of the Sanitary Commissioner of the Central Provinces.

Chief causes of mortality.	Death rate.			Increase or decrease.	
	1912.	1911.	Mean of previous five years.	Compared with 1911.	Compared with mean of previous five years.
1	2	3	4	5	6
Cholera	2·46	·22	·42	+2·24	+2·04
Small-pox	·33	·12	·31	+·21	+·02
Plague	1·38	2·01	1·73	—·63	—·35
Fevers	19·41	16·85	15·85	+2·56	+3·56
Dysentery and diarrhœa	4·23	3·15	3·13	+1·08	+1·10
Respiratory diseases	3·21	2·61	2·46	+·60	+·75
Injuries	·47	·45	·48	+·02	—·01
All other causes	10·85	9·26	9·65	+1·59	+1·19
Total ...	42·34	34·67	34·04	+7·67	+8·30

Plague is the only disease that did not exhibit an enhanced prevalence and mortality as compared with 1911. Cholera was extremely prevalent ; every district was affected and 34,313 deaths were attributed to this disease. The epidemic reached its height in September; it had all but died out by the end of the year. Returning pilgrims from Pandharpur and Puri played an important part in introducing infection in several instances. It seems to be doubtful, however, whether the outbreak was entirely true cholera : water seems to have played an important part in the spread of infection, but a large part is attributed to flies. To small-pox 4,556 deaths were attributed as against 1,714 in the preceding year. Of the former number 1,491 were reported among infants under one year of age. To fevers 270,162 deaths were ascribed. This gives a ratio of 19·41 per mille of population, an increase of 2·56 per mille over the preceding year. The plague death rate was 1·38 per mille as compared with 1·73, the mean rate of the previous quinquennium. Jubbulpore, Nagpur and Narsinghpur were the three districts that suffered most and in them the death rates were 9·17, 5·92 and 4·76 per mille, respectively. All other districts had ratios of less than 3 per mille. During the year 38,719 inoculations were performed.

53. In Madras 1912 was a favourable year as regards rainfall. Both the south-west and the north-east monsoons yielded more rain than in 1911. On the whole the rain was well distributed. Tanjore was the only district that fared badly in both monsoons and the year's fall was 8·57 inches in defect. In spite of favourable climatic conditions the prices of food-grains were progressively higher than in the previous year and very much above the average of the previous fifteen years. Rice, ragi, cholam, and cumbu, the chief staple grains of the Presidency, all sold at prices approximately 25 per cent. above the average.

Madras.

The birth rate rose from 30·4 per mille in 1911 to 30·9 ; this rate is still below the average of the preceding quinquennium, 32·1. It varied in districts from 18·2 in Ganjam to 39·0 in Madras. The average birth rate in towns was 31·5 per mille and ranged between 2·5 in Gudivada (Kistna district) to 87·1 in Coimbatore. In rural areas the birth rate was lower than in towns and averaged 30·8 per mille. There were 104·8 male births for every 100 female births. Excepting Coorg, Madras had as usual a lower birth rate than any other province of India.

The provincial death rate rose from 23·1 per mille in 1911 to 24·3 in the year under report. The mean death rate of the previous quinquennium was 24·0. Only one other province, the North-West Frontier Province, returned a lower death rate than this. The rates in districts varied between 16·4 per mille in Ramnad and 39·2 per mille in Madras. Towns had a higher average death rate, 28·6, than had rural areas, 23·8. Infantile mortality was represented by a rate of 190·4 per mille of births, seven per mille in excess of the rate for 1911. In municipalities the infantile death rate was as high as 248·2 per mille of registered births.

Cholera was more prevalent than in 1911 and caused the death rate of 2·3 per mille of the population. All districts reported deaths from this cause. Cholera was most severe in the Bellary district where it was responsible for a death rate of 8·3 per mille. It is interesting to note that those towns that have a piped water-supply show a continuously decreasing mortality from cholera, which decrease dates from the installation of such a supply. Small-pox was less prevalent than in the previous year and caused a death rate of 0·4 per mille. Plague contributed 6,651 deaths against 15,185 in 1911. As usual Bellary was the most heavily infected district.

54. The birth rate in Madras city was 38·8 per mille as compared with 38·3 in 1911 and 37·7 the average of the preceding quinquennium. Of the total births 16·8 per cent. took place in the public hospitals. The death rate exactly equalled the birth rate, 38·8 per mille against 42·0 in 1911 and 40·2, the mean of the previous five years.

City of Madras.

The male and female death rates are much more nearly equal than in Bombay and Calcutta, being 38·1 and 39·5 per mille, respectively. Infantile mortality fell from 305·4 per thousand births in 1911 to 280·0 in the year under report. Malaria

was responsible for a death rate of 5·7, tubercle 1·3 and cholera 0·7 per mille. Thirty-six deaths from kala azar were reported against 47 in the previous year. A malaria survey of the city is about to be undertaken. There was no indigenous plague and only one imported case. The plague passport system is still in vogue. During the year 142,071 rats were destroyed.

Coorg.

55. The birth rate in Coorg was 26·32 per mille to which it fell from 27·25 in 1911. The mean rate for the previous five years was 26·35. As usual the birth rate of Coorg is lower than that of any other province of British India, and this year is little more than half the rate registered for the Central Provinces. The rate in the different taluks varied between 19·36 and 37·52 per mille.

The death rate, 38·37, was nearly 6 per mille higher than in the previous year and 4 per mille above the preceding quinquennial average. The very considerable decrease in the population that these figures indicate is stated to be chiefly due to the mortality amongst the immigrant coolies in the hospitals at Mercara and Virajendrapet. The latter town returned a mortality rate of 91·86 per mille. The death rate in towns, 64·12, was considerably higher than in rural circles. June, July and August were much the most unhealthy months of the year. Of the 6,713 total deaths recorded 5,697 were ascribed to fevers, 1,142 more than in 1911.

There was no cholera, and plague caused only nine deaths against 57 in the previous year.

Bombay.

56. Meteorological conditions varied but little from the normal. The monsoon was late in becoming established, but the rain it brought was nearly normal in amount though somewhat irregularly distributed. The prices of food grains rose above normal in most districts and in the Panch Mahals district famine was declared. The year was a decidedly unhealthy one.

The birth rate fell from 36·00 per mille in 1911 to 34·97. The mean of the previous quinquennium was 35·53. In districts it varied from 16·54 in Hyderabad to 49·03 in West Khandesh. Rural circles had a higher rate, 36·10, than had towns, 27·97. Of towns Sholapur returned the highest rate 64·73.

The death rate rose from 28·35 in 1911 to 34·88 in the year under report: the mean of the previous five years was 29·20. All districts but one had higher death rates than in the previous year, these rates varying from 12·64 in the Upper Sind Frontier district to 49·79 per mille in Ahmedabad. The death rate in towns averaged 41·48 per mille, in rural circles 33·80. Of towns, Gogha and Dholka, both in the Ahmedabad district, headed the list with death rates of 76·74 and 73·10 per mille, respectively. More deaths occurred in August than in any other month, fewest in December. All the reported causes of death except plague and injuries were responsible for higher death rates than in the previous year. Infant mortality rose from 165·83 per mille in 1911 to 218·70 in the year under review.

Cholera.—Broach was the only district that escaped infection. The cholera death rate for the whole presidency was 3·29 per mille as compared with 0·51 per mille, the mean of the previous five years. Ahmednagar, Poona, East Khandesh and West Khandesh were the most infected districts and had cholera death rates of 8·83, 7·13, 6·96 and 6·23 per mille, respectively. In all 64,505 deaths were attributed to cholera, a figure that has only once been exceeded during the last twenty years, *viz.* in 1900, a famine year, in which cholera caused 163,889 deaths. The epidemic reached its height in July. The people were generally quite ready to have their sources of water supply treated with potassium permanganate. Small-pox was responsible for 6,631 deaths, a bigger number than in any year since 1905. To fevers were attributed 286,321 deaths as against 223,027 in 1911 and 250,077 the mean of the years 1907-12. This large figure represents a death rate of 14·62 per mille. Ahmedabad (33·78) had the highest district fever death rate and Belgaum (5·32), the lowest. That many other diseases than malaria are included under the heading "fevers" is once more shown by the lack of any very definite seasonal prevalence of this cause of mortality. Fewest deaths, 19,073, were recorded in February, most, 28,166, in August, but in

no other month than February were the deaths less than 21,000, and the monthly figures fluctuated more or less regularly between the extremes. Plague was comparatively mild: it was responsible for 28,984 deaths as compared with 100,399 in 1911. The death rate 1·48 was just half the mean of the previous quinquennium. Bijapur was by far the worse infected district where plague was responsible for a mortality rate of 12·88. Belgaum came second with a death rate of 3·54.

City and Port of Bombay.

57. The climatic conditions in the city of Bombay during 1912 were not favourable, the rainfall being in marked defect: this fact accounts in part for the unhealthiness of the year. The death rate, 39·77 per mille, was the highest recorded since 1907: the figure compares very unfavorably with the rate for 1911 (35·69) which was about equal to the rate for 1909 (35·66), the latter being the lowest recorded in the city of Bombay since the advent of plague in 1896. All registerable causes of death, except plague and measles, had a higher mortality rate in 1912 than in the previous year. The total death rate was, however, well below the preceding decennial average. Small-pox, cholera and plague were all epidemic in the city during the year under review. Small-pox accounted for 979 deaths, more than half the number occurring among children under five years of age. Cholera was responsible for 1,790 deaths compared with 123 only in 1911; the former figure is the highest that has been registered in Bombay since 1901. Plague caused 1,717 deaths and was thus the mildest epidemic in the experience of the city. This fact is the most pleasurable feature of the health conditions of Bombay in 1912. There were 3,993 more deaths than in 1911: of this large increase 53·3 per cent. were among children under five years of age.

The birth rate rose from 21·82 per mille in 1911 to 21·96 in the year under report, the highest rate since 1906. Registration of birth appears to be progressively improving, though the Health Officer remarks that the assistance received from the general population is still very meagre: the reasons for registration are beyond their comprehension.

Of the 23,186 births registered, 62·1 per cent. were visited by nurses or midwives of the Municipal Health Department, and 13·9 per cent. of the births were attended by qualified midwives.

As usual the female death rate, 51·96 per mille of sex population, is much greater than the male rate 33·31. The infant mortality rate was 448·2 per thousand of births as compared with 379·8. The unfavourable climatic conditions to which reference has been made, were specially prejudicial to infants: increases were registered under almost every cause of death. Amongst the Lingayats and the Jains the number of deaths of infants under one year of age exceeded the number of births registered during the year.

Vigorous anti-malaria measures continue to be taken in the city and a stegomyia survey is also being carried out.

Burma.

58. The total rainfall of 1912 approximated very closely to the normal, being 4 per cent. in excess in Upper Burma and 2 per cent. in defect in Lower Burma. The distribution was, however, somewhat irregular. The price of food grains were on the whole much higher than in 1911. Rice was abnormally dear in Upper Burma where an average of only 7 seers 7 chattaks were obtainable for the rupee as compared with 10 seers 7 chattaks in 1911. There was, however, no widespread sickness or mortality directly traceable to scarcity of food. The provincial birth rate fell from 32·64 per mille in 1911 to 32·13 in 1912. There was a slight increase in the birth rate of Lower Burma (31·68 as against 31·44) but a greater proportional decrease in Upper Burma (32·96 against 34·85). The district birth rates varied between 43·57 per mille in Tavoy and 18·25 in Rangoon, both districts of Lower Burma. There was but slight difference between the birth rates for towns and rural circles in Upper Burma, but in Lower Burma the rate for towns was only 22·95 as compared with 32·93 in rural circles. This disparity is probably chiefly accounted for by the disproportion of the sexes in towns, the large towns of Lower Burma being thronged with male coolies whose families are elsewhere. In certain other towns, notably in Kyaukpyu

where the birth rate was only 11·74 per mille, the low figure is not capable of being explained by the disproportion of the sexes, and is ascribed by the local authorities to faulty registration.

The death rates of both Upper and Lower Burma were higher than in 1911. In the former it rose from 27·07 to 28·95 and in the latter from 23·99 to 26·00. The district death rates varied from 47·18 in Kyaukse to 19·88 in Kyaukpyu. The average death rates of towns, 44·05 in Upper Burma and 37·23 in Lower Burma, were considerably higher than the rates of rural areas, 27·54 and 24·38, respectively. The coastal districts fronting on the Bay of Bengal with one exception had considerably lower death rates than had the inland districts; this was due to the comparative freedom of the former in 1912 from plague, cholera and small-pox.

The infant mortality rate for the whole province was 228·15 per thousand births, Lower Burma 218·24, Upper Burma 245·66. No satisfactory explanation has been adduced for the considerably higher rate returned by Upper Burma. The highest infant mortality rates for towns were reported for Taungdwingyi, 634·41 per mille, and Nyaunglebin 598·42 per mille. The Society for the Prevention of Infantile Mortality did good work during the year in Mandalay. Proposals are on foot to start similar societies in Thatôn and Rangoon. Registration of vital statistics is in a backward way in Burma. The provincial Sanitary Commissioner estimates that the recorded birth rate is 25 to 33 per cent. below the true figure.

Cholera was responsible for death rates of ·94 in Lower Burma and ·34 in Upper Burma, (means for the previous quinquennium ·90 and ·79, respectively). During an investigation of a small outbreak in the Rangoon Lunatic Asylum, cholera vibrios were found in house flies caught in the asylum. Small-pox was responsible for 6,117 deaths in Lower Burma, 1,842 in Upper Burma. There was a high death rate from malarial fevers in the Minbu district where the excess of "fever" deaths over those in 1911 was 2,659. The provincial Sanitary Commissioner is of opinion that the spread of malaria infection in this district of a virulent type has been directly associated with the extension of irrigation. Travelling dispensaries are to be supplied to this district to cope with future epidemics. Plague was responsible for 3,014 deaths in 1912, less than half the number reported in the previous year.

Rangoon.

59. The birth rate was 18·25 per mille against 18·31 in 1911. This is the lowest rate recorded during the past five years. The death rate was 35·28 as against 38·32 in the previous year. The infantile mortality rate was 331·28 per thousand of births. Plague was responsible for 866 cases and 817 deaths, the second lowest figure recorded since 1905. No month was free from plague: more deaths from this disease, 151, were reported in August than in any other month. During the year 465,408 rats were destroyed. Tubercle of the lungs was the cause of a mortality rate of 1·61 per mille. The incidence of this disease on males and females is approximately equal.

Ajmer-Mêrwara.

60. The birth rate was 47·08 per mille, nearly 7 per mille above the mean rate of the previous five years. Excluding the Central Provinces, this rate is higher than that returned for any other province of British India. The death rate was 38·25 per mille, a satisfactory decline from 44·41 which was the rate in 1911. All diseases except small-pox and respiratory diseases were less prevalent than in 1911. Plague was virtually absent, only thirteen deaths from this cause having been registered. The death rate from "fevers" was 27·77 per mille compared with 34·95 in 1911. This fever death rate is, after Coorg, the highest provincial rate returned, and is probably evidence of defective diagnosis of the cause of death, though the seasonal variation in the death rate indicates the probability that malaria played a large part in its causation.

Red Sea Pilgrim Traffic.

61. Between the 4th January and the 2nd November 1912, 16,024 pilgrims left Bombay for Jeddah in twenty-three vessels. This number is considerably below that of the previous year, 22,852. Before embarkation at Bombay, 10,587 outgoing pilgrims were voluntarily vaccinated and it is estimated that probably three-quarters of the total number were thus protected against small-pox. All pilgrims were subjected to a careful

medical inspection before leaving Bombay. The ships were cleansed and freed from rats. A fully equipped plague observation station was established at Perim. All pilgrims were landed at Camaran to undergo observation for five days (if there was no infectious disease on board) before being allowed to proceed to Jeddah. No infectious disease was reported on ships taking pilgrims from India; there was, however, an outbreak of cholera amongst Indian pilgrims at Camaran. There were 69 deaths from all causes on board outgoing pilgrim ships between Bombay and Jeddah.

Of the Haj of the previous year, 11,670 pilgrims and 2,754 of that of 1912, returned to Bombay from Jeddah in 22 vessels in the year under report: 247 deaths occurred amongst returning pilgrims.

Nine returning pilgrim ships had one death from plague, fifty-six cases of small-pox and six cases of chicken-pox amongst them.

SECTION IV.

JAILS OF INDIA.

62. The year 1912 was one of prosperity over the greater part of India. Though the crops, on the whole, did not come up to the very high standard of those of the previous year, their outturn nevertheless exceeded the average of the preceding five years.

India.

The year opened well with normal and timely winter rains, and prospects were good except in Kathiawar and in some parts of Bombay and Central India where famine, due to insufficient rain in 1911, had already been declared. Later, distress, almost amounting to famine, was evidenced in Baroda and Rajputana. Elsewhere the outlook was hopeful.

The monsoon of 1912 was late in beginning and unusually short; over the greater part of India, the rainfall it brought was, however, only very little below normal: it was, moreover, particularly well distributed. In November, a rain-bearing depression traversed those parts of the country where rain was most needed.

From an agricultural point of view the year was satisfactory. The wheat crop yielded an outturn which, though 2·3 per cent. below the record one of 1911, exceeded the average of the preceding five years by one and a half million tons or 19·2 per cent. The rice crop was good though its yield showed a 13·5 per cent. decrease on that of 1911. This decrease was chiefly brought about by deficient rainfall in September and October in Bihar and Orissa. Sugarcane gave a record yield, 20 per cent. above the preceding quinquennial average. Oilseeds likewise did well. The year closed with excellent prospects for the chief spring crops of 1913.

These few preliminary remarks on climate and crops are prompted by the correlation that exists between the prosperity of India and the population of its jails. This is a matter that has been dealt with fully in the reports of former years and there is no need to labour the point further here, except to emphasize the following fact which has a direct bearing on this question. At least nine-tenths of the population of India is an agricultural one, directly dependent on rainfall and other climatic conditions to a much larger extent than in European countries. The struggle between man and his environment is far more strenuous in India, where climatic and other conditions are peculiarly capricious, than in most western civilised countries. The Indian is, in other words, much more at the mercy of his environment.

63. In India, the mean daily population of jails fell from 97,215 in 1911 to 92,626 in the year under review, a decrease of 4,589. This is 3,046 below the average prison population for the preceding ten years. The decrease, as compared with 1911, is participated in by all administrations except Burma, the Punjab, the North-West Frontier Province and Bombay.

Prison population in 1912.

The prison population of the Andamans fell by 604 (11,884 in 1911 to 11,280 in 1912).

It is not justifiable to assume that these figures denote an all-round decrease in crime in 1912 as compared with the preceding year. This was unfortunately not the case. The release of convicts and civil prisoners, on the occasion of the Imperial Durbar at Delhi in December 1911, explains the fact that 1912 opened with a prison population considerably below normal. This was indeed the chief factor in bringing about the decreased average strength of prisoners in 1912.

64. Sickness and mortality rates show an encouraging improvement in health in the jails of nearly all parts of India. The hospital admission rate (for all causes) fell from 537·7 in 1911 to 535·6 per mille, and the death rate from 18·44 in 1911 to 16·74 in the year under review. This rate of mortality is the lowest ever recorded for Indian jails.

Sickness and mortality rates (excluding the Andamans).

The constantly sick rate per mille also fell from 26 in 1911 to 25 (28 for the decennium 1902-11).

The chief causes of sickness were—

Disease.	Admission rate.
Malaria	105·2 per mille.
Abscess, ulcer and boil	61·3 „
Dysentery	55·4 „
Diarrhœa	41·2 „
Respiratory Diseases	24·0 „

and the principal causes of death were—

Tubercle of the lungs	3·18 „
Dysentery	2·59 „
Pneumonia	1·72 „

These figures show a marked improvement on those of 1911.

If we except respiratory diseases (death rate ·79 against ·76), diarrhœa (·79 against ·78), cholera (·77 against ·10) and small-pox (·13 against ·03), differences that are trifling, the death rate from all the causes of mortality in Indian jails exhibited a satisfactory decline when compared with the figures for 1911.

65. The improvement under this head is extremely satisfactory. The following table is of interest:—

Malaria.

ADMISSION RATES FROM MALARIA PER THOUSAND OF AVERAGE DAILY STRENGTH.

Province.	1894-1898.	1899-1903.	1904-1908.	1909.	1910.	1911.	1912.
Burma	159·5	131·6	45·2	35·5	45·4	44·0	30·4
Assam	450·8	305·3	328·2	573·9	229·6	197·6	152·5
Bengal	292·2	263·5	273·3	230·3	267·3	251·9	252·1
Bihar and Orissa	359·1	395·9	311·2	262·3	209·4	214·3	179·3
United Provinces	296·3	269·7	226·3	212·1	123·2	94·0	74·2
Punjab	689·5	560·5	255·4	139·3	116·0	98·2	137·3
North-West Frontier Province ...	819·3	437·1	532·1	504·4	353·1	197·6	337·9
Bombay	311·7	241·7	150·2	123·8	96·3	86·8	67·0
Central Provinces	273·9	329·5	193·5	151·3	104·8	65·7	49·5
Madras	150·4	100·3	73·2	81·0	94·2	64·2	49·1
India, excluding the Andamans ...	298·5	238·4	199·5	172·4	134·7	113·8	105·2

The downward trend is manifest in all except the Punjab, the North-West Frontier Province and Assam. The Punjab in spite of increased prevalence shows a considerably lower death rate, ·17 as compared with ·76 in 1911. The North-West Frontier Province has a mortality of ·62; there was no death from malaria the year before.

The death rate for all the jails of India on account of malaria amounted to ·52 per mille (·96 in 1911). This figure, the lowest that has as yet been recorded, is less than half the average malaria death rate of the previous decade (1902-11).

The steady decline still maintained is perhaps the most notable of many satisfactory facts brought to light by a study of the jail reports for 1912 and reflects very great credit on the Department responsible.

66. Improvement, though not so marked here as in the case of malaria, has nevertheless been attained. For India as a whole the admission and death rates were:—

Dysentery.

	1910	1911	1912
Admissions	57·7	56·6	55·4
Deaths	3·46	2·91	2·59

Bombay, Punjab, the North-West Frontier Province and Burma show slightly increased death rates over those of the preceding year. Other administrations all show a decrease. Assam and Bengal show the highest admission rates, but the death rates are lower than in 1911. The Central Provinces death rate dropped from 11·47 to 3·83 (average of preceding ten years, 5·32)—a very marked improvement.

Tubercle of the lungs.

67. Though the rate of admissions into hospital on account of tubercle of the lungs fell from 10·5 in 1911 to 9·6 in 1912, and the death rate from 3·65 to 3·18, the admission rate is still slightly above the average admission rate for the last ten years (9·0). The jails of the Punjab still show the highest admission and mortality rates under this head though they have fallen from 24·9 and 7·22 per mille in 1911 to 17·5 and 5·16, respectively, in 1912. These figures are still above the average of the preceding decade, 12·2 and 4·83.

A very decided improvement in the Central Provinces is evidenced by the fall of the admission and death rates from 13·4 and 6·15, respectively, in 1911, to 8·0 and 3·51 in the year under review.

Cholera.

68. There were 130 admissions and 71 deaths from cholera as against 19 and 10 in 1911, and 42 and 23 in 1910. Of the deaths 30 occurred in Burma, 17 in Bombay, 12 in Madras and 8 in Bihar and Orissa.

Enteric Fever.

69. There were 81 admissions and 11 deaths from enteric fever compared with 86 cases and 21 deaths in the previous year.

The following facts and figures are culled, for the most part, from the annual reports of the Inspectors-General of jails of the various administrations.

Bengal.

70. The daily average strength of prisoners was 1,231 less than in 1911. This state of affairs was chiefly due to the liberation of convicts and civil prisoners in December 1911, to which reference has been made above. There was no overcrowding.

It must be noted that the figures here given for Bengal jails are not comparable with those of last year's report. The revocation of the partition of Bengal, that had been effected in 1905, and the constitution of the new province of Bihar and Orissa, both of which took effect from 1st April 1912, added some jails to, and took others away from, the Bengal administration. The Bengal figures in this report are for the jails of Bengal, as at present constituted, for all twelve months of the year.

The death rate from all causes was lower, though the admission rate was higher, in 1912 than in the preceding year, 21·84 and 973·3, as compared with 30·76 and 910·4 in 1911. The decennial averages were 966·3 and 25·03, respectively.

Dysentery was responsible for more deaths than any other disease and had a death rate of 4·05 per mille against 5·65 in 1911. It was worst in the eastern districts. The death rate from malaria was a trifle higher than in the preceding year (1·69 and 1·43 per mille, respectively). There were 41 deaths ascribed to tuberculosis. Pneumonia, which in jails is a disease largely attributable to overcrowding, had a lower case incidence and a lower mortality than in 1911. There were only 4 cases of cholera in all the jails.

The most unhealthy jails are those of Jalpaiguri, Rangpur, Faridpur, Barisal and Krishnagar.

Jalpaiguri has a death rate—5 years' average—of 38 per mille: malaria and dysentery are rife in the district.

Rangpur has an average quinquennial death rate of 59. This district is one of the most unhealthy in Eastern Bengal.

Faridpur has an average quinquennial death rate of 43 per mille. Here, as in Rangpur, a majority of prisoners were received in bad or indifferent health.

Barisal owes its unenviable reputation to the prevalence of dysentery. There were 16 deaths from bowel complaints in 1912. A new pipe water supply is shortly being installed.

As illustrative of the vastly better conditions under which prisoners live compared with the general population, it is interesting to record that the death rate in subsidiary jails, where prisoners are only kept for a few days after conviction, was as high as 39·3 in 1912 as compared with 21·84 for District and Central jails.

All the Central jails were remarkably healthy. They had death rates as follows: Rampore Boalia 13·19, New Central 14·97, Dacca 15·79, Midnapore 20·75, Alipore 16·87, Presidency (Indian) 20·00; Presidency (European) no death.

Assam.

71. The average number of prisoners in the jails of Assam was 166 less than in 1911. The same causes were operative as in Bengal in bringing this about, as well as the fact that the transference of prisoners from Eastern Bengal ceased with the re-adjustment of provincial boundaries.

There were 1,057 more admissions into jail than in the previous year.

There was a marked improvement in the health of the prisoners as compared with 1911.

The admission and death rates which in 1911 had risen to 1,011·3 and 58·89, respectively, fell to 900·6 and 37·50 (preceding decennial average, 892·6 and 37·37). In spite of this the jails of Assam have a very much higher mortality rate than have those of any other province in India.

There was less overcrowding than in 1911.

The total deaths numbered 60, of which 27 occurred in the Sylhet jail. This jail heads the list in this unenviable respect and its deaths were due to dysentery (10), pneumonia (3), malaria (2), tuberculosis (2), leprosy (2), cholera (1) and other causes (7).

As a cause of death, dysentery was easily first. There was an increase in the admission rate from 233·3 to 291·9, but the death rate from this disease fell from 16·42 in 1911 to 15·62 in the year under report. Even so this figure is more than thrice as high as the corresponding figure for the jails of any other administration. The average decennial (1902-1911) death rate for dysentery for the Assam jails is 10·92 per mille per annum.

Both pneumonia and tubercle of the lungs were considerably less prevalent and less fatal than in the previous year: the mortality rates from both these diseases were below the average of the years 1902-1911.

A satisfactory decline in the death rate from malaria from 5·10 in 1911 to 1·25 in 1912, is noteworthy. From July to November a prophylactic issue of 10 grains of quinine twice weekly was enforced, with satisfactory results.'

In spite of the improved health of the Assam jails that this year's report evidences, much remains to be done before their health statistics are made comparable to those of the jails of the other provinces of India.

Bihar and Orissa.

72. This province only dates from April 1st, 1912. This report, however, deals with its jails from the commencement of the year. The average daily strength of prisoners was 735 less than in 1911, though there was a slight increase in the number of imprisonments.

There was an increase in the admission rate for all causes of 41·7 per mille, but the mortality rate fell from 19·28 in 1911 to 17·88 per mille in 1912.

Phthisis was responsible for more deaths than any other disease and its death rate 3·96, as against the previous year's figure of 1·98, was higher than the decennial average 3·30. Bhagalpur Central jail was chiefly responsible for the large increase. Here there were 30 cases with 13 deaths. Defective ventilation of the factory buildings is said to be, possibly, in part, responsible. Steps have been taken to remedy this.

Dysentery which comes next in importance as a cause of mortality was responsible for a death rate of 2·69 per mille, exactly the same as in 1911.

There were 20 cases of cholera among prisoners with 8 deaths. Fourteen of these cases occurred in Puri jail. This outbreak is of interest as Major E. D. W.

Greig, I.M.S., who is in charge of the cholera investigation that is being conducted by the Indian Research Fund Association, was able to demonstrate that the small epidemic owed its origin to a convalescent carrier. He, moreover, adduced evidence to show that flies were instrumental in the spread of infection. Major Greig's report on this outbreak is published in the "Indian Journal of Medical Research" for July 1913.

From the point of view of malaria, 1912 was healthier than its predecessor. There were only 2 deaths from this disease and the admission rate fell from 214·3 in 1911 to 179·3 in 1912. A prophylactic issue of quinine was almost universally employed and apparently with satisfactory results.

On the whole, the health of the prisoners was decidedly better than in 1911: this is ascribed in large measure to the absence of overcrowding.

United Provinces.

73. The fall of 1,605, in the average strength of the jails of these provinces was partly due to the liberation of convicts in December 1911, but a series of good harvests is believed to have been a factor of much importance. There was a considerable decrease in the number admitted into jail. The daily average number of prisoners in 1912 in the jails of the United Provinces is the lowest yet recorded.

There is an all-round very marked improvement in health. The number of prisoners constantly sick fell to 23 per mille from 24 in 1911 and 29, the average number of the last decade. Admissions into hospital were 425·7 per mille as compared with 442·6 in the previous year. The death rate was only 10·48 as against 14·62 in 1911 and 17·96, the average of the ten years 1902-1911. This death rate is very considerably lower than that recorded for the jails of any other province and is a record for these provinces. All diseases alike show a markedly diminished mortality rate. The death rate of the Central jails was only 9 per thousand. These figures speak very highly for the jail administration of the United Provinces.

There was no case of cholera in any of the jails. There were 42 deaths from dysentery as against 51 in 1911. The Inspector-General of Prisons expresses the opinion that the decreased dysentery mortality is chiefly due to better cooking of the jail diet. Many jail Superintendents hold that the prophylactic issue of quinine is also instrumental in checking dysentery.

There were 9 deaths from malaria, a rate less than half that of the preceding year. The admission rate for this disease was only 74·2 per mille. It must be noted that there was in 1912 but little malaria among the free population. Quinine was issued as a prophylactic as in former years.

Tubercle of the lungs was responsible for 45 deaths, a rate of 2·02 per mille as against 2·80 in 1911. The Inspector-General expresses the opinion that, taking into consideration improved methods of diagnosis, there is less tubercle in the jails of the United Provinces than there was 10 or 20 years ago.

Punjab.

74. On 1st October the Delhi jail was transferred from the Punjab administration to the Government of India. It is included, however, in this report, for the last time, amongst the jails of the Punjab.

The daily average strength of convicts shows a slight increase over that of 1911, 12,010 as against 11,910, and this in spite of the liberation of the convicts in December 1911, on the occasion of the Imperial Delhi Durbar. Imprisonments showed an increase of 2,062 over the number for the preceding year. In one district, Shahpur, the rise in crime was 100 per cent.

Serious overcrowding occurred in 14 jails.

The year was a healthy one. The ratio per mille of strength constantly sick fell from 33 in 1911 to 29, which is the average of the preceding 10 years. The admission and mortality rates, from all causes, both showed satisfactory declines, from 631 and 27·04, respectively, in 1911 to 604·5 and 19·15 per mille in the year under report.

The admissions to hospital from malaria show an increase from 98·2 to 137·3, but this figure is little more than half the average of the previous decade. The malaria

mortality rate was only ·17 per mille as compared with ·76 in 1911 and ·60 the average of 10 years. There was but little malaria amongst the free population of the Punjab in 1912.

There was only one case of cholera in the Punjab jails during the year.

Dysentery showed a slightly increased mortality, 2·58 per mille against 2·02 in 1911.

Tubercle of the lungs, once more, is the principal cause of the Punjab jail mortality and was responsible for an admission rate of 17·5 and a death rate of 5·16 per mille. These figures, big as they are, are a decided improvement over the corresponding ones for 1911, 24·9 and 7·22, respectively. Tubercle is still more prevalent in the jails of the Punjab than in those of any other administration.

Major W. H. C. Forster, I.M.S., has submitted a report on the "Etiology of Tubercle in the Punjab jails." He believes that a certain proportion of cases are infected in the jails and that certain conditions connected with overcrowding, ventilation, diet, general sanitation, disinfection and the use of cubicles are responsible for this. These matters are receiving the careful consideration of the local Government who have already sanctioned the construction of a special jail for tuberculous patients. Pneumonia has lower admission and death rates than in 1911 and than those of the average of the years 1902-11.

There was no case of plague and only 5 deaths from small-pox.

North-West Frontier Province.

75. The vital statistics of the jails of this province are evidence of the healthy state of its occupants. The mortality rate, 11·71, though a fraction higher than that of 1911, is still remarkably low and very much less than the preceding decennial average. This rate is lower than that returned for the jails of any other administration, with the exception of the United Provinces and Madras.

There were only 11 deaths among convicts. The mortality during the years 1911 and 1912, was only half that of the two previous years and one-third less than the lowest previously recorded.

The average strength of the jails shows an increase of 28 as compared with 1911.

Central Provinces and Berar.

76. A markedly diminished death rate and a drop in the ratio of prisoners constantly sick from 22 in 1911 to 14, evidence the healthiness of the year under report in the jails of the Central Provinces. Though several other administrations record a lower death rate than 19·81, none show so low a figure as 14 per mille constantly sick amongst their prisoners.

With the exception of diarrhœa, anæmia and debility and diseases of the respiratory system, which caused a slightly enhanced mortality, all the causes of death were attended with a much diminished death roll as compared with the previous year. The most marked improvement is noted with regard to dysentery. Admissions to hospital from this disease fell from 95·9 to 60·7 per mille and deaths from 11·47 to 3·83. This improved state of affairs was nowhere better evidenced than in the Raipur Central jail. Here in 1911 there had been 252 admissions and 33 deaths from dysentery; in 1912 there were only 35 cases and 2 deaths. Of the 35 cases 8 were admitted into jail suffering from the disease. This fact bears witness to the prevalence of dysentery amongst the free population. Careful attention was paid to the question of fly-breeding and fly-prevalence. Marked as the improvement is, dysentery still ranks first as the cause of death in the jails of these provinces.

The mortality rate from tubercle of the lungs was little more than half that of the preceding year (3·51 as against 6·15 per mille).

There was one case each of plague, small-pox and cholera.

Madras.

77. The daily strength of prisoners fell for similar reasons to those mentioned above in the case of Bengal. The number of prisoners received during the year were more numerous than in 1911.

With the exception of cholera, from which there were 12 deaths as compared with 2 in 1911, respiratory diseases and diarrhœa, there was an all-round reduction in the mortality rates of the jails of Madras.

Each of the past 3 years was a record one of low mortalities. The following table is of interest :—

	1908.	1909.	1910.	1911.	1912.
Death rate per mille (from all causes)... ...	29·80	25·24	15·25	13·83	11·37

This steady progress in the decline of jail mortality rates is an eloquent tribute to the jail administration of the Presidency. The smallness of this year's mortality was only bettered by the jails of one other administration, that of the United Provinces.

The constantly sick rate per mille fell from 21 to 20.

Tubercle of the lungs was responsible for more deaths than any other single cause, but the death rate attributed to it, *viz.*, 2·32, compares very favourably with 3·18, the rate in 1911 and 3·12 the average rate of the decade 1902-11. The reduced admission and mortality rates from this disease in the year under report is attributed to the reduced average prison population.

The dysentery death rate, 1·10, is lower than that recorded by any other administration and compared with the decennial average of 3·52 is most satisfactory.

The Vizagapatam jail was responsible for most of the cholera cases and deaths. The Inspector-General expresses the opinion that flies were instrumental in the spread of infection.

The malaria admission and death rates were exceedingly low. The prophylactic issue of quinine was enforced in 5 jails.

No other disease was sufficiently prevalent to call for notice here.

It is satisfactory to note that the new diet which was introduced in 1908, as an experimental measure in 3 large Central jails, and which has since been universally adopted in the jails of Madras, seems to have met with a large measure of success. This diet is smaller than the old scale by 5 ounces, but in spite of this 68·55 per cent. of prisoners gained in weight during confinement. The average percentage that gained weight during the years 1901-07, when the old diet was in force, was 61·6. The improved health of the prisoners is attributed by the Inspector-General in no small measure to the qualities of the new dietary. There is certainly but very little room for improvement in the vital statistics presented in this year's report.

Bombay.

78. The daily average population of the Bombay jails shows an increase of 455 over the figure for 1911. A portion of the increase was indirectly due to the scarcity that prevailed in 3 or 4 districts of the Presidency. There was considerable overcrowding in many of the prisons.

The admission to hospital rate is in excess of that of 1911 (483·4 and 429·5, respectively) but the mortality rate from all causes shows a decline from 18·73 per mille in 1911 to 17·23 in the year under report. This figure is appreciably lower than the last decennial average, 20·49 per mille.

The rates per mille of prisoners constantly sick was 22, the same figure as was reported for 1911. Cholera attacked 5 prisons and was responsible for a death rate of 1·88 per mille of the Bombay jail population. In the Ahmedabad jail, where there were 16 cases and 7 deaths, the disease was almost certainly fly-borne. At Yerrowda (2 cases and 1 death) there was a strong suspicion that a carrier was responsible for the outbreak. Amongst the Deccan gang there were 19 cases and 8 deaths. The cases probably arose from the drinking of water from a river which the prisoners crossed daily going to work. There was cholera in the country surrounding all three jails.

Pneumonia was the disease that entailed the largest mortality of any, though its death rate was only little more than half that of 1911 (2·32 and 4·42, respectively),

The death rate from dysentery was 1·99. The disease was more prevalent than in the previous year.

Tubercle of the lungs also caused a death rate of 1·99.

Burma.

79. The average jail population of Burma was slightly larger than in 1911. The health of the prisoners was not on the whole as satisfactory in 1912 as it was in the preceding year. It is true that the constantly sick rate remained stationary at the low figure of 15 per mille, and the admission rate fell to 288·9 from 307·3, but the death rate rose from 12·28 in 1911 to 20·69 in the year under report. This death rate, 20·69, is the highest recorded since 1900 and was largely brought about by the very high rates of mortality of the jails in Rangoon (40·96) and Myingyan (38·63). Excluding these two the remaining 28 jails had a mortality of 14·78.

In Rangoon, the enhanced death rate is ascribed by the Inspector-General to :—

(1) The larger proportion of prisoners in bad health on admission (3·20 per cent. as against 0·99 per cent. in 1911), the ill-health being largely due to the opium, morphia or cocaine habit.

(2) Overcrowding of the jails throughout the province prevented transfer of prisoners from Rangoon.

(3) Overcrowding of Rangoon prison itself.

At Myingyan, there were 19 deaths from cholera and 9 from tuberculosis. This is the only jail in which cholera assumed epidemic form. The 23 cases and 19 deaths recorded all occurred between 22nd November and 7th December. The total number of cholera attacks and deaths in all jails was 38 and 30.

Dysentery shows an increased prevalence and an enhanced mortality as compared with 1911. The admission to hospital rate rose from 15·0 per mille to 20·6 and the death rate from 1·41 to 2·39. This admission rate for dysentery is, however, considerably lower than that returned by any other administration.

Malaria was less prevalent than in 1911, though one more death from this disease occurred (7 and 6, respectively). In one jail the prisoners in hospital suffering from malaria are provided with mosquito nets.

Tuberculosis causes more deaths than any other disease and 1912 witnessed a further advance, admissions and deaths numbering 155 and 79 as compared with 110 and 42 in 1910 and 132 and 60 in 1911. This steady increase is a disquieting feature of the Burma report. Rangoon jail reported more cases and deaths from tubercle (39 and 23) than any other. The building of the separate enclosure and ward for tuberculosis has been delayed by want of funds. This would appear to be a very real want. Insein jail reports 38 cases with 21 deaths and Myingyan 32 with 9 deaths.

There were 19 cases and 3 deaths from enteric fever and 5 fatal cases of plague were reported.

An outbreak of scurvy in the Rangoon jail of 84 cases with one death merits attention chiefly because of the unusual symptoms that the disease presented. The disease was almost invariably febrile; the brawny swellings were confined to the calf and thigh; the coagulability of the blood of the patients was normal: the issue of fresh vegetables, fresh milk, meat and fish did little to improve matters, whilst issues of sweet potatoes had a very beneficial effect.

The Andamans.

80. By the Andamans, in this report, is meant the convict station of Port Blair, an area not more than 20 miles in its longest diameter, situated on the south side of the southernmost Island of the group.

The average strength of its convict population was 604 less than in 1911, 11,280 as compared with 11,884.

The health conditions were not so satisfactory, the constantly sick rate rose from 62 to 75, and the admission to hospital rate and the death rate were 1,624·2 and 31·65 per mille as compared with 1,249·8 and 24·40 in 1911.

As in previous years there was no cholera and no small-pox. The admission to hospital and mortality rates from all the other chief causes of disease show an increase over those of the previous year. Pneumonia, dysentery and tubercle in this order, were the chief causes of mortality, whilst malaria as usual was by far the chief cause of sickness.

Malaria was more severe than in 1911, and caused admission and death rates of 993·7 and 2·57, respectively, as compared with 680·4 and 2·02 in the previous year. The Senior Medical Officer reports that malignant tertian was the most prevalent form of the disease. Examination of blood films of patients gave the following results :—

Malignant tertian	...	...	...	...	61·1 per cent.
Benign tertian	...	...	...	...	30·5 ,,
Quartan	...	...	...	...	8·4 ,,

Since the report of 1911 was issued, a valuable memoir has been published by Major S. R. Christophers, I.M.S., on the subject of malaria in the Andamans. He shows that *Nyssomyzomyia ludlowi* is the mosquito chiefly responsible for the spread of the disease. This anopheline breeds in brackish water and was rarely found more than a quarter of a mile from the influence of salt waters. There is a very close relationship between the amount of malaria in any given village and the propinquity of the latter to the sea coast.

In 2 out of 53 specimens of *Nyssomyzomyia ludlowi* dissected at Port Mouat, zygotes of malignant tertian were found. A very exact relation between the distribution of *Nsm. ludlowi* and malaria was demonstrated. Christophers states that, though other common species of anophelines such as *Nsm. rossi* and *My. barbirostris* may play a subsidiary part, *Nsm. ludlowi* is undoubtedly the chief carrier. Malignant tertian was the only species of parasite proved to be carried by this anopheles, but it is probable that it carries all forms of the parasite. As regards the form of parasite most prevalent, in the relatively healthy year in which the observations were made, Christophers found that in children the simple tertian was much the most common form, whereas amongst labouring convicts, less exposed to infection than children but subject to conditions favouring relapse, 50 per cent. or more of cases were quartan infections. This is explained by the greater tendency to relapse that quartan infections exhibit. That relapses play an important part in the morbidity of the convicts is demonstrated by the synchronism of the onset of the rainy season and the rise in hospital admissions for fever. The malaria endemicity of the convict station is not very high; only one village was found having a spleen rate of over 50 per cent. The prevalence of anopheles is likewise only moderate; potential mosquito breeding places are common, but many of these contain fish of the genus *Haplochilus*. This doubtless explains why mosquitos are not more numerous than they are. In spite of this moderate endemicity labouring convicts suffer much from malaria and Christophers is inclined to attribute this to deficient treatment of malaria cases in hospital.

Some observations were made in 1912 by the Senior Medical Officer as to the value of a daily dosage of 3 grains of quinine as a malaria prophylactic by its administration to inmates of the female jail. Of 94 women thus treated, 64 developed malaria, whilst of 94 untreated 76 developed malaria. From this experiment one must assume that quinine in 3 grain doses daily is not a very efficient prophylactic.

There were 15 cases of fever with jaundice, all from the most malarious portions of the western district.

Dysentery shows an enhanced death rate as compared with 1911, 6·03 as against 3·70, though the prevalence of the disease was much the same. An inquiry on the subject of dysentery has just been started under the auspices of the Indian Research Fund Association and it is hoped to include the Andamans in the locale of the inquiry. There are considerations that point to a somewhat close relationship between malaria and dysentery in the Andamans.

Admission and death rates from pneumonia were higher than in 1911, this in spite of the fact that a large amount of attention was paid to the question of ventilation of the barracks during the year. There is an intimate association between the incidence of fatal lobar pneumonia and malaria infection.

Pulmonary tuberculosis exhibits an increased prevalence and a slightly enhanced mortality over 1911, but the figures for the last two years show a decided improvement in this respect.

SECTION V.

VACCINATION.

81. The total vaccination work done in British India during the year 1912-13 was represented by 9,919,723 operations, of which 8,792,917 were primary cases and 1,126 806 re-vaccinations: the corresponding figures for the year 1911-12 were 9,684,249, 8,780,525 and 903,724, respectively. It will be seen that in the total work there was an increase of 235,474 operations, made up by increases of 12,392 under primary vaccinations and of 223,082 under re-vaccinations. Increases occurred in all the provinces, except Madras, the Central Provinces and the small provinces of Coorg and Ajmer-Merwara. In regard to primary cases, there was a decrease, compared with the preceding year, in Bengal, the Central Provinces, Burma and Ajmer-Merwara, and in re-vaccinations Madras, the Central Provinces, Coorg and Ajmer-Merwara showed decreases. The only provinces in which there was a decrease under both classes of work were the Central Provinces (due in part to the elimination of the statistics relating to Feudatory States) and in Ajmer-Merwara.

Vaccination in India.

The quality of the primary work showed an improvement on that of the preceding year; the percentage of success rising to 96·54 from 96·34, but in re-vaccinations the rate declined to 70·57 from 72·82. In the former, the rates varied between 99·59 per cent. in Bihar and Orissa and 88·4 in Madras; and in the latter, between 93·17 in Ajmer-Merwara and 53·19 in Bombay—all the rates are higher than in 1911-12.

The mean number of operations performed by each vaccinator was 1,630, to which it rose from 1,584 in 1911-12: the range between the highest and lowest was very considerable, 3,968, the highest, in the North-West Frontier Province and 911 the lowest in Ajmer-Merwara; the next lowest was 964 in Assam.

The vaccination operations performed at dispensaries numbered 187,450 compared with 149,629 the year before, but except in Bengal, and Bihar and Orissa, which between them account for 153,306 of the total, and the Punjab and Burma which jointly contribute 21,308 operations, the vaccination work at dispensaries is inconsiderable.

The ratio of successful vaccinations per thousand of the population was 36·49 in 1912-13, which lies between the ratios of 35·06 in 1910-11 and 37·22 in 1911-12. Neglecting the small province of Coorg with the high ratio of 64·66 per thousand, the extremes were 49·11 in the North-West Frontier Province the highest, and neglecting the small province of Ajmer-Merwara 25·94, 29·06 in Bombay, the lowest.

On an estimated birth rate of 40 per thousand of the population, 46·19 per cent. of the children under one year of age were successfully vaccinated, showing a decrease compared with the rate of 48·01, in the preceding year. The usual great variations occurred, the highest rates being 71·02 in the Central Provinces and 68·06 in the Punjab, and the lowest 20·10 in Burma and 8·82 in Coorg.

The cost of the department during the year 1912-13, amounted to Rs. 16,30,427 to which it increased from Rs. 15,61,261 in 1911-12. The average cost of each successful case was two annas and eleven pies, or one pie more than the year before: the cost of each case varied between nine annas and two pies in Bombay and one anna in Bihar and Orissa.

82. Reference to the vaccine lymph employed and the sources of supply in the several provinces will be found in the succeeding paragraphs. Nearly all the provinces possess their own vaccine institutions, the exceptions being Bihar and Orissa, the Central Provinces, the North-West Frontier Province and the small provinces of Coorg and Ajmer-Merwara. Steps have been taken for providing a vaccine depôt for Bihar

Vaccine Lymph.

and Orissa, and for the Central Provinces the establishment of a vaccine depôt has been sanctioned, towards the cost of which the Government of India have made a grant of Rs. 50,000. For the improvement of the vaccine depôts in the United Provinces, the Punjab and Burma, the Imperial Government have also made grants of rupees half a lakh to each.

Delhi.

83. In consequence of the creation of the Delhi province, the vaccination statistics for 1912-13 have been rendered separately from those of the Punjab. The total number of vaccination operations performed during the year was 13,232, of which 11,267 were primary cases and 1,965 re-vaccinations, showing decreases of 14,576, 8,098 and 6,478, respectively, compared with 1911-12. The falling off in primary work is accounted for by the large number of persons vaccinated in the Durbar area during the preceding year, and also to the transfer of two tehsils to the Punjab, while that in re-vaccinations is explained by work having been done in two zails only instead of in seven as was the case the year before. The percentage of success in primary cases was 98·13, and in re-vaccinations 65·25. House to house vaccinations were done in three places.

On an estimated birth rate of 40 per thousand of the population, 63·32 per cent. of the children under one year of age were successfully vaccinated. In Delhi city, where the Vaccination Act is in force, 66·9 per cent. of the infants calculated to be available were protected.

The cost of the department was Rs. 2,403, and the average cost of each successful case three annas and three pies.

Bengal.

84. The vaccination report for 1911-12 related to Bengal as constituted before the revision of the partition, while that for 1912-13 relates to the province as now constituted; the figures for the two years as herein stated are for the same areas, those of the former year having been compiled for purposes of comparison. The total number of vaccination operations during 1912-13 was 1,984,399 against 1,946,584 in the previous year. Primary cases numbered 1,787,143 and re-vaccinations 197,256, compared with 1,803,652 and 142,932, respectively, showing a decrease of 16,509 in the former and an increase of 54,324 in the latter. The improvement in re-vaccination was due to a greater prevalence of small-pox during the year. Compared with the previous year there was an increase of operations in 15 and a decrease in 12 districts. The largest increases were in Midnapore (27,339), Dacca (17,422), Chittagong (16,971), Mymensingh (14,020) and Tippera (11,135), and the largest decreases in Bakarganj (12,113), Faridpur (12,048) and Khulna (11,744). The diminished work in Bakarganj is attributed to the aversion of the Ferazi Muhammadans to vaccination, to the difficulty in obtaining good vaccinators due to trouble in the realization of vaccinator's fees, and to the attitude of the people: various reasons are assigned for the decreases that occurred elsewhere.

The ratio of success in primary vaccination was 98·24 and in re-vaccination 61·29 per cent., respectively.

On an estimated birth rate of 40 per thousand of the population, 36·41 per cent. of the children under one year of age were successfully vaccinated, and in municipalities 75·2 per cent. of the available infants were afforded protection. It is stated that the Eastern Bengal districts are mostly responsible for the low rate of infant protection and steps are being taken to ensure better results in future.

Vaccination was performed with lymph direct from the calf, lanoline lymph, glycerinated lymph from the Shillong vaccine depôt and the arm-to-arm method. The percentages of success by each method were—the figures in brackets are for the previous year—primary cases, 98·51 (99·81), 98·19 (98·39), 97·28 (96·75) and 90·10 (*nil*), and re-vaccinations, 44·78 (54·13), 43·54 (44·59), 62·55 (63·68) and 77·51 (50·24).

At the Calcutta animal vaccination depôt 2,253 calves were vaccinated and 6,75,228 grains of lymph manufactured, the corresponding figures for 1911-12,

being 1,973 and 568,113, respectively. The requirements of lymph of the districts of Bihar and Orissa were supplied by the Calcutta depôt, and those of the districts of Eastern Bengal by the Shillong depôt.

The cost of the department during 1912-13 amounted to Rs. 1,72,212 and the average of each successful case was one anna and six pies.

Bihar and Orissa.

85. The vaccination returns of the newly constituted province of Bihar and Orissa are rendered separately for the first time for 1912-13. The total number of operations performed during the year was 1,296,313 of which 1,269,400 were primary cases and 26,913 re-vaccinations. In 1911-12, the total number of operations was 1,316,089. The most noticeable decreases occurred in Cuttack (18,212), Champaran (4,944) and Monghyr (4,191). In the two latter places it is attributed to the prevalence of cholera and plague.

The percentage of success in primary operations was 99·59 and in re-vaccinations 69·35.

The provincial Sanitary Commissioner remarks that at the present time the ratio of mortality from small-pox compared with the number of successful vaccinations, shows that the former is lower and the latter higher than it has been at any time during the last decade.

On an estimated birth rate of 40 per thousand of the population, 47·01 per cent. of the children under one year of age were protected. For all municipalities the percentage of the infants successfully vaccinated was 73·59. It is said that the attention paid to vaccination in rural areas does not seem to have extended to municipalities. In the towns of Gaya, Bihar, Dinapore, Chapra, Darbhanga, Monghyr, Jamalpur, Bhagalpur, Cuttack and Hazaribagh, the records show that of a total of 11,814 available children only 6,316 or a little over a half were vaccinated.

Lanolinated lymph was supplied to all districts from the Calcutta depôt. It was of good quality and the work done with it is reported to have been very satisfactory. Plans and estimates for a vaccine depôt for the province, to cost Rs. 1,44,000, have been sanctioned and the building is being put in hand.

The total cost of the department was Rs. 82,305, and the average cost of each successful case one anna.

Assam.

86. The total number of operations performed during the year amounted to 333,363 compared with 305,845 in 1911-12, showing an increase of 27,518 operations. Of the total, 298,983 were primary cases and 34,380 re-vaccinations, against 290,915 and 14,930, respectively, in 1911-12. The increase in vaccination work occurred in 9 out of 12 districts and one Native State, and was specially noticeable in the Sylhet district where vaccination was vigorously pushed as a preventive measure against small-pox, which was prevalent in several villages. The experiment to work the district with licensed vaccinators is unlikely to be successful owing to difficulties in the realization of vaccinators' fees.

It is satisfactory to note that among the "Mahapurushias", in the Kamrup district, who are notorious in their objection to vaccination on religious grounds, 6,422 operations were performed.

The percentage of success was 97·91 in primary cases and 73·99 in re-vaccinations, against 98·14 and 80·98, respectively, in the previous year.

Legal action was taken against a Gonok found inoculating in a village in the Sylhet district.

Dispensary vaccination, which is not considerable, is now carried on in the hill districts only.

On an estimated birth rate of 40 per thousand of the population, 23·44 per cent. of the children under one year of age were protected, as compared with 21·98 in 1911-12. In the areas where the Vaccination Act is in force, 62 per cent. of the total number of children under one year available for vaccination were successfully vaccinated, against 79 per cent. in the previous year. In the town of

Sylhet only one-fourth of the available children were vaccinated. This unsatisfactory state of affairs is reported to be due to the fact that on account of small-pox in the towns, the vaccinators were largely engaged in persuading people to accept re-vaccination. The attention of the Civil Surgeon and the Municipal Commissioners is being drawn to this failure to carry out primary vaccinations.

All the vaccination operations were performed with glycerinated lymph manufactured at the vaccine depôt at Shillong, the quality of which is reported to have been excellent. The number of tubes loaded during the year was 1,819,859 against 1,716,938 in the previous year, and the average cost per tube was 2·4 pies. Plans and estimates for a new depôt are under consideration.

The total cost of the department was Rs. 66,343 against Rs. 64,501 in the previous year, and the average cost of each successful case was three annas and six pies or two pies less than in 1911-12.

87. Vaccination work in the United Provinces again showed an improvement in 1912-13. The total number of operations performed was 1,592,438 (1,468,162 primary and 124,276 re-vaccinations) against 1,494,557 in 1911-12, showing an increase of 97,881 operations. Of the 48 districts there was an increase in the number of successful primary operations in 41. Of these Budaun shows the greatest (6,518) followed by Bulandshahr (5,238), Azamgarh (4,196), Meerut (3,341), Etah (3,300) and Gonda (3,280). There were decreases in 7 districts, *viz.*, Kheri (12), Allahabad (29), Rai Bareli (63), Agra (532), Almora (1,466), Sultanpur (1,795) and Hardoi (3,341). In Kheri, Allahabad, Almora and Sultanpur there was, however, an increase in the number of successful re-vaccinations. Various reasons are given in explanation of the diminished work.

United Provinces.

The percentage of success in primary cases was 97·19 as compared with 97·65 in 1911-12, and in re-vaccinations 73·12 as compared with 78·13, showing a decline in both classes of operations.

On an estimated birth rate of 40 per thousand of the population, 52·73 per cent. of the children under one year of age were successfully vaccinated as compared with 50·28 in the previous year. The total number of successful vaccinations performed on children under one year of age in municipal towns was 83,031, showing a percentage of 89·3 of the number calculated to be available.

At the bovine lymph depôt, Patwa Dangar, great difficulty was experienced in obtaining a sufficient supply of suitable calves. An outbreak of rinderpest occurred and steps were taken for the inoculation against the disease of all calves coming from infected districts. During the year, 386 calves (259 cows and 127 buffaloes) were operated upon, of which 355 (239 cows and 116 buffaloes) proved successful, against 387 and 370, respectively, during the previous year. The total quantity of crude lymph obtained was 11,285 grammes against 9,335·6 grammes in the preceding year, the average yield per cow calf being 22·1 grammes and that per buffalo calf 51·7 grammes against 19·9 and 36·6 grammes, respectively, in 1911-12. From the 11,285 grammes of crude lymph obtained, 69,743 grammes of glycerinated lymph and 1,256·4 grammes of glycerine paste were prepared. In the absence of a demand, lanoline paste was not manufactured. The decrease in the issue of lymph in glass tubes and the increase in its supply in bulk in metal tubes, continued during the year. Arm-to-arm vaccination has now been replaced by vaccination by calf lymph in 35 districts, 13 districts having been added during the year. It is proposed to take up two districts more during the next season, bringing the total to 37 districts.

The total cost of the department during the year amounted to Rs. 1,80,512, against Rs. 1,53,200 in the previous year. The average cost of each successful case was one anna and nine pies against one anna and seven pies in the preceding year. The increase in expenditure is chiefly due to the improvement in the pay of the vaccine staff, and to increased expenditure on the bovine lymph depôt consequent on the expansion of the use of calf lymph in place of arm-to-arm vaccination.

88. The amount of vaccination work done in the province during 1912-13 was very satisfactory, being 16 per cent. in excess of the figure for the previous year, and 39 per cent. greater than the average for the previous quinquennial period. The total number of operations performed amounted to 1,032,847 against 892,289 in 1911-12. The appreciable rise is ascribed to the increased demand for protection against small-pox which was widely prevalent in the province: over 30,000 deaths occurred from the disease during the year, the highest number recorded since 1896. The increase in small-pox was brought to the notice of all Civil Surgeons and the necessity for special attention being given to primary vaccination and re-vaccination was urged.

Punjab.

Of the total number of operations, 710,994 were primary and 321,853 re-vaccinations compared with 701,700 and 190,589, respectively, in the previous year. It will be noticed that the increase is principally in re-vaccinations. Increases in primary operations occurred in 17 districts and decreases in 11, the most noticeable of the latter being, Lahore (9,109), and Gujrat (5,851). The diminution is explained as due to the smaller number of children available. In regard to re-vaccination there was an increase in 21 districts and a decrease in 7, the largest among the latter occurred in Lahore (6,500). The percentage of success was 97·99 in primary cases and 73·50 in re-vaccination against 95·03 and 71·85 in 1911-12, showing an improvement under both heads.

House-to-house vaccination was only carried out in a few districts, as the system did not prove a success in others. The Gurdaspur district is the only one in which the system has proved popular and is said to be possibly due to the district being fortunate in its staff. The number of operations performed in some of the Hill States is almost incredible. The highest percentage of population successfully vaccinated during the year in British territory was 9·2 in Dera Ghazi Khan, while in the small Hill States of Mangal and Kuthar the percentages reached were 31 and 45, respectively, and in the larger States of Rampur, Bilaspur and Nalagarh percentages of 11, 13 and 15 were recorded.

The vaccinations performed at dispensaries increased to 10,603 from 1,590 in 1911-12. Of the total no less than 9,092 operations were performed in four districts which were badly infected with small-pox.

On an estimated birth rate of 40 per thousand of the population, 68·06 per cent. of the infants were protected, compared with 65·79 in the previous year. In municipal towns in which the Vaccination Act is in force, 83 per cent. of the total number of children under one year of age available for vaccination were protected, as compared with 70 per cent. in those towns in which the Act is not in force: the corresponding figures for 1911-12 were 86 and 64 and for the quinquennial period 79 and 63, respectively. No municipal town was brought under the operation of the Vaccination Act during the year.

The principal buildings of the vaccine institute at Lahore were completed during the year 1912; certain additional improvements are being carried out, such as the provision of new stables for the separate housing of pre- and post-operative calves and for the isolation of the sick. During the year 284 calves were successfully vaccinated, and the average yield of crude lymph was 43·3 grammes from each buffalo calf and 15·8 grammes from each cow calf.

The institute supplied vaccine lymph to all districts in the Punjab, to 26 Native States, to the North-West Frontier Province, Kashmir, Baluchistan, Sind, Kathiawar, Nepal, Tibet and Afghanistan, to military medical officers in the Punjab and the North-West Frontier Province and to private individuals. The method of preparation and testing of chloroformed glycerinated vaccine was the same as before. The virulence of stock lymph was successfully maintained by alternate passage from buffalo to cow calf and *vice versâ*. Vaccine lymph was supplied to the Bangalore and Belgaum vaccine institutes with which potent strains were successfully established. The total number of tubes issued was 34,942 as compared with 28,971 in the previous year; reports of the results obtained were very satisfactory. From the Attock, Rohtak and Dehra Ghazi Khan districts, however, complaints were received that the chloroformed glycerinated vaccine did not confer immunity to small-pox. Searching enquiries were held on the spot, in several places, but no

satisfactory evidence was forthcoming against the potency of the lymph. The subject is still under enquiry and a general investigation throughout the province is proceeding.

The total cost of the department amounted to Rs. 1,25,812, or an increase of Rs. 1,492 compared with last year. The excess is chiefly on account of the increased demand for vaccine obtained by local bodies, on payment, from the Institute. The average cost of each successful operation during the year was 2 annas and 4 pies as compared with 2 annas and 8 pies in the previous year.

North-West Frontier Province.

89. The total number of operations performed in the North-West Frontier Province, including agencies, during the year was 152,740, of which 125,109 were primary operations and 27,631 re-vaccinations, against 112,579 and 21,223, respectively, in the previous year—increases of 12,530 in the former and 6,408 in the latter. The increase in re-vaccinations is small compared with the increase of over 13,000 in the previous year The Bannu district again had the largest increase in both classes of work, Peshawar and Kohat coming next. There has been an increase in the work under every heading in each district, the least marked being in the number of re-vaccinations. People readily bring their children for vaccination, especially if small-pox is prevalent or threatened, but the utility of re-vaccination is not yet grasped by the poorer classes.

The total number of persons vaccinated in the agencies and in the Sherani country was 10,343, a decrease of 1,760 as compared with the previous year. This decrease is accounted for by the absence of any report from the Amb State where 2,000 persons were vaccinated in 1911-12. Reports from the agencies indicate that the people have no prejudice against vaccination, and that the relations existing between the villagers and the vaccinating staff are good.

The number of successful primary vaccinations was the highest ever recorded, the figures being 120,285 against 107,123 in the previous year. The percentage of successful primary cases and re-vaccinations was 99·01 and 88·88 against 98·74 and 83·66, respectively, in the previous year.

On an estimated birth rate of 40 per thousand, 62·85 per cent. of the children available were protected compared with 50·88 per cent. in the previous year. In municipalities, as usual, the number of children under one year of age vaccinated, exceeded the number calculated to be available. The reason is that all births are not registered and many children not born in the towns are brought in for vaccination.

The lymph used during the year was supplied by the Punjab vaccine institute, and gave excellent results.

The total cost of the department during the year was Rs. 15,236 and the average cost of each successful vaccination amounted to one anna and eight pies as compared with Rs. 15,493 and two annas, respectively, in the previous year.

Central Provinces.

90. The area served by the vaccination department in the Central Provinces remained the same as in the previous year, but under the orders conveyed by the Government of India, the statistics of the Feudatory States have been omitted. The total number of vaccination operations during the year 1912-13 amounted to 574,510 (503,956 primary cases and 70,554 re-vaccinations) against 583,101 (512,312 primary and 70,789 re-vaccinations) in the previous year. Decreases occurred in 12 districts and were most marked in Raipur (7,657), Chanda (5,944), Nagpur (3,231), Akola (3,039), Damoh (1,766) and Bhandara (1,271) : in the remaining six districts the fall was of less than 1,000. In all the districts the chief cause of the decrease was the prevalence of cholera and the consequent deputation of the staff on cholera duty, but in Damoh and Bhandara, plague accounted for the decrease to some extent, while in Nagpur and Raipur the results were affected by fewer infants being available owing to a lower birth rate and higher mortality. The provincial Sanitary Commissioner remarks that notwithstanding the prevalence of small-pox, re-vaccination has not made any headway. It has been suggested that the re-vaccination of children of 12 to 13 years of age in primary schools can be done without much

trouble, provided the age is not considered too early. The Sanitary Commissioner drew up a leaflet on the subject, which was sent to the Director of Public Instruction for issue to schoolmasters who are the best disseminators of elementary knowledge in rural tracts. Complaints were numerous regarding the inadequacy of the staff, both in numbers and intelligence. In many districts men are hardly to be obtained at all, and generally the class of man available is much below what is required. It is held that better salaries must be offered and a better stamp of man obtained for both work and supervision. Several improvements were, however, effected during the year, *viz.*, the grant of allowances in certain districts where there was much dissatisfaction among the vaccinating staff; more attention paid to the clauses of the Vaccination Act, the system of notices and prosecutions being enforced with good results; the supply, in some districts, of instrument cases to the staff; efforts made to improve the diagnosis of small-pox by the issue of leaflets; introduction of a system of tour programmes for the staff.

The percentage of success was 98·29 in primary cases and 72·90 in re-vaccination.

On an estimated birth rate of 40 per thousand of the population, 71·02 of the infants were successfully vaccinated compared with 69·18 per cent. the year before. In municipal towns the number of children under one year of age successfully vaccinated exceeded the number calculated to be available: this is accounted for by wrong classification of age, the presence of immigrants, and the fact that among the infants who died and therefore not reckoned as available, many may have been vaccinated. The introduction of school inspections, the co-operation of schoolmasters and the more careful application of the Vaccination Act, have produced an improvement. The extension of the Act to notified areas is much to be desired.

Glycerinated calf lymph prepared at the head-quarters stations was used in 18 districts, while in the remaining four the vaccinators were allowed to prepare their own supply. A central vaccine depôt has been sanctioned, towards which an Imperial grant of Rs. 50,000 has been made, and the equipment is now being received from England. The depôt is to be started on tentative lines at the Lunatic Asylum, Nagpur.

The cost of the department amounted to Rs. 69,385 as compared with Rs. 72,643 in 1911-12, and the average cost of each successful case was two annas and one pie as against one anna and ten pies the year before.

Madras.

91. The total number of operations in the Presidency decreased from 1,602,977 in 1911-12 to 1,586,344. Primary operations rose to 1,461,790 from 1,455,485, but re-vaccinations fell to 124,554 from 147,492 in 1911-12. The largest increases were recorded in the districts of Salem (11,261), Madura (7,623), Guntur (7,498) and Kistna (5,427), and the greatest decreases in Malabar (24,002), Ganjam (10,387), Cuddapah (3,613) and South Canara (3,047). The decreases are variously accounted for by the prevalence of epidemic diseases, insufficient staff and to the absence of small-pox in epidemic form.

The percentage of success in primary cases fell to 88·4 from 89·7 in the previous year, but in re-vaccinations it rose from 77·2 to 79·0.

On an estimated birth rate of 40 per thousand of the population, 34·36 per cent. of the infants were successfully vaccinated as compared with 34·89 per cent. in the previous year. In municipal towns 73·5 per cent. of the available infants were afforded protection against 71 per cent. the year before.

Lanoline paste from the King Institute, Guindy, was used in all the local fund districts and municipalities. The percentage of success in the local fund area fell from 89·6 in 1911-12 to 88·0, and similarly in municipalities from 93·2 to 92·7. Glycerinated lymph yielded a percentage of success of 95·1 against 97·6 in the preceding year, and was used only by the Madras Corporation.

The cost of the department amounted to Rs. 3,28,342 against Rs. 3,16,559 during 1911-12, and the average cost of each successful case was 3 annas and 11 pies against 3 annas and 9 pies in the previous year.

92. The total number of vaccination operations performed in Coorg again showed a fall, the number declining from 13,369 in 1911-12 to 13,073 in 1912-13; of the total 8,977 were primary cases and 4,096 re-vaccinations against 8,425 and 4,944, respectively, in the preceding year. The percentage of success was 94·64, in the former and 81·98 in the latter, against 94·83 and 81·92, respectively, in 1911-12.

Coorg.

On an estimated birth rate of 40 per thousand of the population, 8·82 per cent. of the children available were protected compared with 8·54 per cent. in 1911-12. In municipal areas between October 1911 and September 1912, there were 224 births and 162 children under one year of age were vaccinated, 102 of them successfully.

The total cost of the department amounted to Rs. 2,876 against Rs. 2,818 in 1911-12, and the average cost of each successful case was 4 annas and 2 pies, or four pies more than the year before.

93. The total number of vaccination operations performed in the Bombay Presidency during 1912-13 was 782,170 of which 711,222 were primary cases and 70,948 re-vaccinations, against 692,413 and 68,707, in 1911-12, showing increases of 18,809 and 2,241, respectively. There was an increase in primary vaccinations in all the districts except the Sind Registration District and the Presidency Circle. The decrease in Sind is attributed to several causes, the principal ones being a reduction in the number of children available for vaccination, the large number of operations performed in the two preceding years during epidemics of small-pox, the difficulty of obtaining vaccinators and opposition to vaccination. A report on the working of the experimental scheme relating to the control of vaccinators by local bodies which was tried for a further period of 12 months, was submitted to Government for consideration.

Bombay.

The percentage of success in primary cases and re-vaccinations was 97·99 and 53·19, respectively, against 99·00 and 51·18 in the previous year.

On an estimated birth rate of 40 per thousand of the population, 56·43 per cent. of the children available were protected as compared with 55·36 per cent. in the preceding year. In towns the number of children successfully vaccinated again exceeded the number calculated to be available.

At the vaccine institute, Belgaum, certain extensions and alterations were proposed. During the year 775,587 doses of vaccine lymph were distributed including supplies to Native States, against 673,812 doses in 1911-12. The results of the vaccine issued to vaccinators in the Presidency show case and insertion success rates of 97·95 and 93·85, respectively, against 99·21 and 95·70, respectively, in the previous year.

The following table shows the several descriptions of lymph used, the number of operations performed with each, and the comparative results obtained :—

Districts.	Description of lymph.	Number of operations.		Successful cases, excluding "unknown."		Percentage of success, excluding "unknown."	
		Primary.	Revaccination.	Primary.	Revaccination.	Primary.	Revaccination.
Western Registration District ...	Glycerinated ...	133,961	10,803	115,388	5,013	96·71	62·87
Presidency Circle	Animal	5,843	1,854	5,291	85	99·18	67·46
	Glycerinated ...	15,517	13,831	13,975	14	97·75	29·17
Central Registration District ...	Glycerinated ...	162,804	8,121	149,378	4,277	92·63	77·45
Southern Registration District ...	Human	15,161	441	15,147	393	99·92	89·12
	Animal	4,195	73	4,191	73	99·90	100·00
	Glycerinated ...	131,311	18,244	124,916	7,711	98·97	56·17
Gujarat Registration District ...	Human	27,375	2,443	26,894	236	98·90	9·72
	Glycerinated ...	103,509	3,970	93,053	1,408	96·42	47·71
Sind Registration District ...	Human	75,132	2,974	66,572	1,492	98·61	71·18
	Animal	2,833	1,249	2,668	490	99·07	81·26
	Glycerinated ...	18,040	692	15,819	281	94·75	57·11

The total cost of the department during the year, amounted to Rs. 3,76,586 compared with 3,53,707 in 1911-12. The average cost of each successful case was 9 annas and 2 pies against 8 annas and 9 pies in the previous year.

94. Vaccination work in Burma during the year 1912-13 again showed an improvement when the total operations numbered 544,352 as compared with 517,392 during 1911-12. Of the total, 422,089 were primary operations and 122,263 re-vaccinations. As compared with the returns for 1911-12 the total of primary operations was 432 less and that of re-vaccinations 27,392 more, the total of all operations being 26,960 in excess of the number in the previous year. The great increase in re-vaccination work is attributed mainly, if not entirely, to the prevalence of small-pox in many districts. In the Pegu division, however, there was a fall in re-vaccinations towards which Rangoon contributed 11,036 and the Prome district 4,501; the Amherst district also showed a fall of 1,411.

Burma.

The percentage of success in primary cases was 96·69 against 96·61 in the previous year, and in re-vaccinations, 67·64 against 71·79.

At dispensaries a total of 10,705 operations were performed, of which 5,968 were primary cases and 4,737 re-vaccinations.

On an estimated birth rate of 40 per thousand of the population, 20·10 per cent. of the children available were protected as compared with 19·02 in the previous year. In towns the number of infants successfully vaccinated exceeded the number calculated to be available. This is a constantly recurring phenomenon and is generally attributed to infants from outside being brought into the towns, but it is also probably due to errors in the registration of births.

Reference is made to inoculators being active in many districts, and in the Thaton, Pyapon and Pegu districts outbreaks of epidemic small-pox were directly traced to their action. One inoculator was sentenced to 9 months' rigorous imprisonment, and a number were convicted and fined.

The total amount of glycerinated vaccine prepared at the Meiktila vaccine depôt was 760,294 doses, of which 757,518 doses were issued, as compared with 693,913 in 1911-12 and 613,444 in 1910-11. The quantity of lymph prepared and issued during 1912-13 is the largest on record. The potency of the strain was maintained by vaccine lymph taken from inoculated rabbits and on three occasions by the use of human lymph for inoculating calves. The local strain was found more potent than the lymph obtained from Bombay and the United Provinces. The Director of the institute points out that the buildings provided for the preparation of lymph are far too small for the greatly increased work of the department which has risen by nearly 300 per cent. since 1903-04. The matter has, however, been in abeyance for want of funds, but a grant of Rs. 50,000 for the improvement of the depôt has been made by the Imperial Government, and the preparation of plans, etc., are now to be proceeded with.

The total cost of the department during the year was Rs. 2,05,199, an increase of Rs. 4,595 on the previous year's expenditure. The average cost of each successful operation was 7 annas and 3 pies, which is two pies less than in 1911-12.

95. In Ajmer-Merwara the total vaccination operations during 1912-13 numbered 13,825 primary cases and 1,117 re-vaccinations compared with 15,486 and 1,034 in the preceding year. The percentage of success in the two classes of work were 95·21, and 93·17, respectively, against 98·17 and 81·81 in 1911-12.

Ajmer-Merwara.

On an estimated birth rate of 40 per thousand of the population, 53·86 per cent. of the children under one year of age were protected compared with 47·36 per cent. in the previous year.

The total cost of the department during 1912-13 amounted to Rs. 3,216 against Rs. 3,098 in 1911-12; the average cost of each successful case was 3 annas and 11 pies as compared with 3 annas and 2 pies in the previous year.

96. Particulars of vaccination in the Army will be found in Statement III, Appendix to Section V, of the Annual Report of the Sanitary Commissioner with the Government of India.

Vaccination among troops.

SECTION VI.

MEDICAL INSTITUTIONS.

(Contributed by the Director General, Indian Medical Service.)

A.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private aided).

97. These institutions, at the end of 1912, numbered 2,733, an increase by 26 on the figure for 1911, and everywhere the demand for more is making itself felt. The travelling dispensary system which has been so successful in the United Provinces and the Punjab is being introduced elsewhere as well. The number of persons treated has risen in spite of the healthiness of the year to 29½ millions; and operations are being more freely resorted to than ever.

India.

Expenditure rose from £863,168 in 1911 to £904,449; and there is little reason to believe that further economies will reduce this amount. Again this year the assistance afforded by individual subscriptions by Indians shows a tendency to diminution,—the amount subscribed in 1912 being only £45,557, as compared with £47,252 in 1911.

The following tabular statement shows the main features of the operation of these institutions during 1911 and 1912:—

Province.		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of patients.	Number of operations.
Eastern Bengal and Assam ...	1911	373	24,584	3,695,044	3,719,628	83,043
	1912	figures not available; shown partly under Assam and partly under Bengal.				
Assam	1912	147	8,754	1,530,551	1,539,305	24,904
Bengal, excluding Calcutta ...	1911	360	45,791	3,224,508	3,270,299	146,950
	1912	399	35,056	3,719,041	3,754,097	114,174
Calcutta	1911	15	25,819	303,410	329,229	33,754
	1912	15	27,856	310,066	337,922	36,113
Bihar and Orissa	1912	195	30,203	2,073,073	2,103,276	126,860
Central Provinces	1911	167	13,449	1,717,846	1,731,295	43,699
	1912	168	13,926	1,697,344	1,711,270	45,702
United Provinces	1911	379	65,954	4,234,550	4,300,504	199,704
	1912	383	70,194	4,245,694	4,315,888	204,756
Punjab	1911	302	74,884	4,022,865	4,097,749	233,637
	1912	307	84,967	4,424,584	4,509,551	251,865
Burma	1911	188	57,896	1,411,143	1,469,039	43,116
	1912	190	59,842	1,507,167	1,567,009	46,618
Bombay	1911	335	55,891	2,135,640	2,191,531	92,365
	1912	336	59,534	2,293,705	2,356,118	100,255
Madras	1911	514	80,829	5,878,225	5,959,054	225,335
	1912	516	85,371	6,119,400	6,204,771	238,734
North-West Frontier Province ...	1911	49	11,352	750,323	761,675	32,892
	1912	50	12,536	783,531	796,067	36,117
Baluchistan	1911	25	4,222	221,622	225,844	4,565
	1912	27	4,559	252,607	257,166	5,298
Total ...	1911	2,707	460,671	27,595,176	28,055,847	1,139,060
	1912	2,733	492,798	28,956,763	29,452,440	1,231,396

It will be observed that, on account of the redistribution of the areas hitherto shown as Bengal and Eastern Bengal and Assam into three provinces, *viz.*, Bihar and Orissa, Assam and Bengal, the figures in these areas are not comparable with those of 1911.

Bengal (excluding Calcutta).

98. In the redistribution above mentioned there was a large transfer of hospitals to the new province of Bihar and Orissa; and many were brought in by the inclusion of Eastern Bengal.

Measures are being taken in some of the larger institutions to build wards for tubercle cases, and to improve the nursing. The expenditure during the year amounted to £68,182, of which Indian subscriptions covered £13,316.

Calcutta.

99. There was an all round increase of attendance. More nurses were sanctioned for the Eye, Campbell and Howrah hospitals. Paying patients pay about 11·5 per cent. of the cost of these institutions. The total expenditure amounted to £81,700 and Indian subscriptions to £2,760. A children's ward is being built at the Eden hospital, and the surgical block of the Sambhu Nath hospital has been completed.

Assam.

100. The system of travelling dispensaries has just been instituted on a small scale in the Lushai and Naga hills. There was an increase in numbers treated in the province of 9 per cent. The temporary dispensaries opened at fairs have done useful work in treating over 94,000 cases. The total expenditure was £20,917, of which sum £1,320 was met by Indian subscriptions.

Bihar and Orissa.

101. More dispensaries are required. The itinerant dispensaries are doing good work, as are those opened at fairs. Attendance at all institutions continues to increase. The sale of quinine by many agencies has been pressed during the year.

The total expenditure was £46,394 and Indian subscriptions amounted to £7,272. It is proposed to build a hospital for Europeans at Ranchi and to improve the accommodation at Patna and Bankipore.

Central Provinces.

102. The introduction of travelling dispensaries in the less settled parts of the country is under contemplation. There has been an increase in the number of Civil Assistant Surgeons. The necessity for more family wards, as opposed to general wards, is commented on by the Inspector-General. Total expenditure was £33,718 and Indian subscriptions amounted to £5,517.

United Provinces.

103. Treatment by travelling dispensaries has been very successful; the number of these institutions is now 57 and they treated over half a million persons. The new Medical College was formally opened; a tuberculosis sanitarium for open air treatment is in operation. An increasing number of native midwives take advantage of courses of instruction. Expenditure during 1912 was £101,732 and Indian subscriptions amounted to £9,221.

Punjab (including Delhi).

104. Although the year was a healthy one there was a very marked increase in the number of patients; thus, in-patients rose from about 75,000 to 85,000, and out-patients from 4 millions to nearly 4½ millions. Consequently there was some overcrowding. The system of charging fees to those who can afford to pay has been tried in some districts, with varying degree of success; in some parts it is unpopular. There is urgent need for improvement in many of the smaller dispensaries.

The total expenditure was £89,516—an increase of £11,000—and towards this sum Indians subscribed £2,454.

North-West Frontier Province.

105. The numbers coming for treatment continue to increase. Two travelling dispensaries have been started and are a great success. The expenditure amounted to £13,343, an increase of nearly £2,500; but Indian subscriptions fell to £74.

106. A new dispensary has been opened at Nushki, and several existing ones are being modernised. There has been a marked increase in the number of patients; this is well marked among musulman women. The expenditure amounted to £8,351 of which sum Indians subscribed £23.

Baluchistan.

107. There has been a further well marked rise in attendance, by nearly 100,000 patients. The Rangoon General hospital is in working order, but a large staff of medical officers and nurses is required. The cadre of civil assistant surgeons in the province has been increased; that of sub-assistant surgeons is still below strength. The total expenditure was £107,928 and Indian subscriptions amounted to £1,521.

Burma.

108. There is an increasing demand for State dispensaries. There is a movement in favour of the institution of tuberculosis hospitals, and it is hoped the larger municipalities will take up this matter. Expenditure amounted to £149,399 and Indian subscriptions to £1,397, the latter figure showing a decline of £250.

Bombay.

109. There was an all round increase in attendance, although the year was healthy. More operation and labour cases among women are seeking admission. The midwives treat large numbers in their own homes. The total expenditure amounted to £183,269, a large increase on last year, and Indian subscriptions to £1,682.

Madras.

B.—Civil Hospitals and Dispensaries.—(State-Special, Railway and Private non-aided).

110. The number of these institutions and of patients is as detailed in the following tables.

State-Special and Railway Hospitals.

Province.		Number of institutions.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta)	1912	81	12,530	246,406	258,936	7,464
Calcutta	1912	2	3,604	4,493	8,097	392
Assam	1912	47	3,333	59,401	62,734	835
Bihar and Orissa	1912	67	512	161,109	161,621	5,185
Central Provinces	1912	70	3,336	131,925	135,261	2,263
United Provinces	1912	126	18,478	270,222	288,700	6,459
Punjab	1912	155	6,869	465,673	472,542	18,549
North-West Frontier Province	1912	27	7,418	122,877	130,295	3,235
Baluchistan	1912	8	1,837	54,159	55,996	945
Burma	1912	74	14,496	205,562	220,058	3,510
Bombay	1912	70	10,583	227,339	237,922	5,238
Madras	1912	99	10,354	205,118	215,472	4,613
Total ...	1912	826	93,350	2,154,284	2,247,634	58,688
	1911	829	89,347	2,030,098	2,119,445	52,840

Private, non-aided institutions.

Province.	Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta)	136	6,304	1,089,450	1,095,754	24,046
Calcutta	2	...	4,822	4,822	189
Assam	11	73	40,928	41,001	543
Bihar and Orissa	66	8,403	697,913	706,316	21,681
Central Provinces	32	1,490	124,347	125,837	2,293
United Provinces	49	5,459	348,488	353,947	8,948
Punjab	7	4,162	52,928	57,090	3,403
North-West Frontier Province	7	1,811	63,884	65,695	12,392
Baluchistan	4	138	28,624	28,762	926
Burma	1	136	460	596	...
Madras	45	9,184	295,177	264,361	13,476
Bombay	309	14,639	2,027,366	2,042,005	59,623
Total 1912	669	51,799	4,774,387	4,786,186	147,420
Total 1911	706	48,796	4,712,616	4,761,412	140,640

C.—Lunatic Asylums.

111. The table below shows the strength of the asylum population in 1912, and the statistics of sickness and mortality.

The population increased during the year by 409, and the number of discharged cured rose from 676 to 771. The daily average sick continues to rise; in 1910 it was 397·58, in 1911, 516·19 and in 1912, 582·01; and the number of deaths rose from 548 to 776. The reasons given for these increases vary; but generally it appears that tubercle is becoming more prevalent. Overcrowding no doubt contributes largely to the amount of sickness; and year by year, with an increasing number of admissions, the overcrowding makes itself more acutely felt. The new asylum under completion in Bombay will no doubt improve the position in that Presidency; but there is urgent need for the new institution it is proposed to build in Bihar, especially for European patients—

Province.	Number of asylums.	Admitted and re-admitted during year.	Total asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Criminal lunatics.
			Males.	Females.	Total.					
Bengal	3	265	1,079	230	1,309	117	85	1,063·46	84·57	617
Assam	1	66	245	53	298	16	47	232·25	24·76	98
Bihar and Orissa	1	72	254	50	304	21	26	246·30	12·56	117
United Provinces	3	406	1,222	369	1,591	155	118	1,234·02	171·56	286
Punjab	1	181	723	193	916	155	71	682·57	111·87	180
Central Provinces	1	74	287	73	360	44	29	284·34	16·33	94
Bombay	7	429	1,164	294	1,458	128	160	1,048·9	39·8	211
Madras	3	260	780	237	1,017	90	87	772·85	77·77	220
Burma	2	178	672	125	797	45	153	593·38	43·31	351
Total 1912	22	1,931	6,426	1,624	8,050	771	776	6,158·07	582·01	2,174
Total 1911	22	1,804	6,090	1,551	7,641	676	548	5,981·31	516·19	2,124

112. The death rate was low and there were no epidemics; but there is overcrowding in spite of recent additions to the asylums. This must continue until the central asylum at Ranchi is built.

Bengal.

113. The sick rate and death rate were high; the latter was largely due to tuberculosis. Tubercle wards have been introduced, but there is still overcrowding.

Assam.

114. The asylum cannot accommodate the lunatics of the province, and it is reported to be defective in every respect. As far as possible it will be patched up for the period that must elapse before the Ranchi asylum is built. The death rate rose from 91·2 to 105·5 per 1,000.

Bihar and Orissa.

115. There has been a rise in the sick rate, and at Agra deaths increased from 44 to 59; the prevalence of phthisis is noticeable, but there was an improvement in the figures for dysentery. Plans for tuberculosis sheds at Agra are being considered. European accommodation is unsatisfactory, and should be improved at once.

United Provinces.

116. There was a slight decline in the sick rate, but it is still higher than it used to be. There was a small outbreak of cholera, but it accounted for 4 deaths only. Masonry floors are being introduced throughout the asylum; this, it is hoped, will reduce the sickness from tubercle and bowel trouble.

Punjab.

117. The year has been a healthy one and there was little sickness. The asylum buildings have been improved in many ways, and there is no overcrowding.

Central Provinces.

118. The general health was fairly good, but the death rate rose from 8·7 to 15·3 per cent. of the average strength. This rise was due to increased mortality from diarrhœa and dysentery at Nanpara and from tubercle in the other asylums.

The pay of the warder staff has been raised, with satisfactory results.

Bombay.

119. The number of admissions continues to increase. The health of the inmates was fair, but the death rate was higher than usual.

Madras.

120. The year was an unhealthy one and the death rate rose from 13·48 to 31·29 per cent. of average strength. Cholera accounted for 22 deaths. Schemes for improving the flooring of the Rangoon asylum are under consideration, and the system of trenching of night soil has been replaced by one of removal.

Burma.

D.—Medical Colleges.

There are now, since the opening of the King George's Medical College, Lucknow, five colleges which afford the course of instruction for University degrees, three also train military assistant surgeons. During the year the students numbered 163 civil and private male, 149 military and 99 female students, a total of 1,871.

121. The number of students on the rolls at the end of the year was 314, of whom 24 were military pupils and 29 were women.

Bombay, Grant Medical College.

The new Physiological laboratory has been taken into use.

Eighty-seven students, of whom 6 were females, obtained the L.M.S.; 36 obtained the degree of M.B., B.S., 1 the M.D. and 2 the B. Hy.

122. There were 432 students, of whom 42 were women and 41 military.

Madras.

The question of removing the college to a new site is under consideration.

Twenty students passed the L.M.S. and 14 obtained the M.B., C.M. degree. Seven women obtained the college qualification of medical practitioner.

The sanitary inspector class now has 57 students.

123. Proposals for the creation of a new college are under consider-
Lahore. ation.

The number of students was 141; the decline is ascribed partly to the number of rejections in the Intermediate Science examination, and partly to the increasing popularity of Science degrees. There were only 2 female students. 24 students obtained the M.B., B.S. and 3 the old L.M.S.

124. The question of providing a hostel for male students, also a materia medica museum and physical laboratory, is still under consideration. The total number of students rose to 731, of whom 23 were women and 84 military pupils. 25 students obtained the final M.B. and 19 the L.M.S.
Bengal.

The demand for admission to the college is enormously in excess of the capacity of the institution; out of 544 applicants only 153 were admitted.

125. The King George's medical college has opened its second session. There are at present 53 students, 3 of whom are women.
Lucknow.

E.—Medical Schools.

There are 14 schools which train civil, military and private pupils for the passing out diploma.

The students numbered 2,176, or 111 less than last year.

126. *Berry White School, Dibrugarh.*—The year closed with 113 students, including 5 military. 18 students passed the final medical examination, and 7 the examination for compounders.
Assam.

Two new boarding houses have been built; also a new X-ray room.

127. *Rangoon Medical School.*—There were 42 students at the end of the year. 10 passed the final examination. The school was removed to the old General Hospital building, and a hostel is now available, for 32 boarders. There is urgent need for a maternity ward, for clinical study is insisted on.
Burma.

128. *Campbell School, Calcutta.*—The students number 211 males and 11 females; of these 52 men and 2 women passed the final examination for the diploma of the school, and 85 the compounder's test. The school now gives post-graduate instruction to civil Sub-Assistant Surgeons.
Bengal.

Dacca School.—There is great need for more accommodation and for hostels. The students number 192, of whom 4 are women. 29 obtained the school diploma and 84 became compounders.

129. *Agra Medical School.*—The students numbered 287, of whom 66 were women and 73 military. 29 males and 13 females passed the final examination.
United Provinces.

The accommodation is insufficient to meet the demand for admission.

130. *Lahore Medical School.*—The number of students was 349 of whom 74 are military. 32 passed the final examination, and 7 women obtained the midwives' and 42 the "dhais" certificate. The school is overcrowded and there is great lack of clinical material. The Principal again urges the necessity for its removal to another town.
Punjab.

131. *Temple School, Patna.*—The female students hostel has been completed. There were 111 male and 2 female students. Of these 10 males passed out as licensed medical practitioners, and 33 became compounders.
Bihar and Orissa.

There is not much desire to enter the service of Government.

Orissa School, Cuttack.—A new hostel is urgently required. There were 128 male and 6 female students; of these 24 male obtained the passing out diploma, and 29 became qualified compounders.

132. *Hyderabad School.*—The students number 74, and 12 passed the final examination. The financial position of the school is bad, and lack of accommodation and funds restrict its operation as a teaching institution.

Bombay.

Byramjee Jejeebhoy School, Poona.—There are 135 students, including 3 women and 34 military. 26 obtained the school diploma.

Byramjee Jejeebhoy School, Ahmedabad.—There are 153 students, including 1 woman and 50 military. 21 obtained the school diploma.

133. *Medical School, Vizagapatam.*—The students number 61, of whom 2 are women. Lack of accommodation limits the usefulness of the school. 8 students obtained the diploma.

Madras.

Medical School, Royapuram.—There are 214 students of whom 79 are private paying ones, but more accommodation is urgently required. There are 40 military and 20 women pupils. 34 passed the final examination.

Medical School, Tanjore.—There are 88 students, of whom 1 is a woman and 2 are military. 15 passed the final examination.

F.—Annual Report of the X-Ray Institute of India, Dehra Dun, 1912.

134. Two classes of instruction have been held during the year numbering 38 students in all, including officers of both services in military employ, Assistant Surgeons and Sub-Assistant Surgeons (Civil and Military). Of this number 30 passed the prescribed examination of whom 5 obtained the special proficiency certificate, and 8 failed to pass.

The number of skiagraphic examinations made at the Institute during the year was 1,216. The number of cases sent for treatment was 85.

The new workshops and store-rooms required in connection with the Civil Repair Scheme were completed and taken over from the Public Works Department.

In addition to radiography and radio-therapy, work has been done with sinusoidal, direct, and high frequency currents, electric light baths, vibratory massage, etc.

SECTION VII.

SANITARY WORKS.

135. In paragraph 123 of this report for 1911-12 the allotments made by the Government of India to provincial Governments during the years 1910-11 and 1911-12, for the improvement of sanitation are mentioned. For the years 1912-13 and 1913-14, the Imperial Government have assigned large grants for expenditure primarily on urban sanitary works, though it was said expenditure might be incurred on rural sanitation also, if provincial Governments were satisfied, in the first instance, that practical schemes were available The grants made to the several provincial Governments, non-recurring and recurring, respectively, are:—Madras 27 and 6 lakhs; Bombay 27 and 6 lakhs; Bengal 20 and 5 lakhs; the United Provinces 27½ and 6 lakhs; the Punjab 14½ and 4 lakhs; Burma 10½ and 3 lakhs; Bihar and Orissa 10 and 3 lakhs; the Central Provinces 10½ and 3 lakhs; Assam 3 and ½ lakhs. The non-recurring allotment of 27 lakhs to Bombay includes half-a-lakh for improving and refitting the Bombay Bacteriological Laboratory at Parel, Bombay; the allotments of 27½, 14½ and 10½ lakhs, respectively, to the United Provinces, the Punjab and Burma, include half a lakh each for improving the vaccine depôt in each of those provinces, and the allotment of 10½ lakhs to the Central Provinces includes half a lakh for the establishment of a central vaccine depôt in the province. Recurring grants of half-a-lakh each have been made for expenditure on sanitary works in Delhi, the North-West Frontier Province and Bangalore. These grants are also primarily for urban sanitation, but a portion may be spent on suitable rural schemes. It may be mentioned that along with these grants the Imperial Government also sanctioned a recurring grant of 5 lakhs for the Indian Research Fund.

India.

In connection with the grants to local Governments it has been requested that some account of the works or objects on which the grants are expended may be given in the provincial sanitary reports.

The following paragraphs contain information, culled from the reports of provincial Sanitary Commissioners, Sanitary Engineers and Sanitary Boards in regard to the work carried out or in progress in their respective provinces during the year.

136. During the year 1911-12, the total income of the 111 municipalities in the province, excluding Calcutta, (the number has decreased from 130 owing to the reconstitution of the province on the 1st April 1912) was, including the opening balance, Rs. 78,08,730 against Rs. 75,31,496 the year before: the increased income was derived from municipal rates and taxes. Of the total income, 36·15 per cent. was spent on sanitary works, original and recurring, against 35·08 in the previous year; 7·82 per cent. on roads against 7·69; 4·36 per cent. on public safety against 4·35; and 28·21 per cent. on all other requirements against 33·57. The total expenditure on sanitary works during 1911-12, was Rs. 34,33,598 as compared with Rs. 32,20,960 during the previous year. There was increased expenditure under six of the eight sub-heads, the largest increase being Rs. 1,01,631 on conservancy and Rs. 1,76,994 on water supplies: the decreased expenditure occurred under drainage (Rs. 66,779) and treatment of sick (Rs. 84,761). The increase under water supplies was shared by all Divisions, and under conservancy by three. The decrease under drainage is explained by expenditure in the previous year on large schemes in four towns. The local Government remarks that the increased expenditure indicates greater activity on the part of municipalities and a greater realization of their responsibilities. Progress, however, is slow, much time being lost by municipalities in the consideration of projects prepared by the Sanitary Engineer, while applications for Government loans to finance schemes are, as a rule, so imperfectly prepared in the first instance, that considerable delay is inevitable.

Bengal.

During the year the total cost of the sanitary works executed by Government, Municipalities, District Boards and private individuals, was Rs. 12,30,769. The

largest item was the construction of the Barisal water works (Rs. 1,19,470), followed by works in connection with the Darjeeling sewage scheme and ropeway (Rs. 92,411); works in connection with the Jessore water works scheme (Rs. 63,186); new water supply scheme, Kurseong (Rs. 54,588); works in connection with the Hooghly-Chinsura water supply (Rs. 51,108). There were other works costing less than half-a-lakh each.

During 1912-13, grants amounting to Rs. 7¼ lakhs were provided for sanitary improvements, but advantage was not taken of the full amount, Rs. 5,41,388 only having been allotted, and nearly half this amount, Rs. 2,50,000, was for one scheme—the extension of the Howrah water works.

The septic tank installations gave excellent results during the year, and in very few instances was it necessary to call the attention of mill managers to defects. Several new tanks were constructed during the year, thus doing away with the old and objectionable hand removal latrines.

Action is being taken to give effect to the scheme for the appointment of health officers and trained sanitary inspectors in municipalities. A class to train 30 students each year as sanitary inspectors was opened at Calcutta in February 1913, and it is hoped that much needed improvement in the conservancy and sanitation of municipal areas will result from the entertainment of qualified men.

Sanitary Board.

137. The Board held three regular meetings during the year: an extraordinary meeting was also held in conference with the Malaria Committee of Bengal to consider the question of joint action in regard to the special Public Works division for investigating drainage schemes for malarious areas. Among the more important questions discussed at the ordinary meetings were rules for the duties of the Board and the Sanitary Engineer and the status of the latter, and an arrangement by which an annual programme of sanitary engineering works to be carried out is to be drawn up by the Sanitary Engineer.

The year was one of great activity in the Sanitary Engineer's office and more work was done than in any previous year. The necessity for the services of a second Assistant Sanitary Engineer has been recognised by the creation of such an appointment. The progress of constructional work was again slower than could be desired, but is attributed to the laxity of contractors, who allege the difficulty of obtaining materials.

For water supply schemes, sketch projects were under preparation by the Sanitary Engineer for nine towns, the more important of which were Narainganj (estimated cost Rs. 1,38,515), Bhatpara (Rs. 4,85,000), Utterpara (Rs. 1,17,000) and Chandpur (Rs. 1,11,900). The only sketch project for a water supply in Bengal prepared outside the Sanitary Engineer's office was for Chittagong. Detailed schemes were prepared for four towns. Of 11 water-works under construction those at Chandpur were completed during the year, those at Khulna practically so, and those at Barisal were partially completed and formally opened. The improvement of the existing water supplies at Mymensingh, Dacca and Berhampore were under consideration.

It is estimated that from the water works of Bengal (excluding Calcutta) 683,279 persons received a daily average of about 6,120,746 gallons of water, at actual costs varying from ·44 annas per 1,000 gallons at Darjeeling to 4·8 annas per 1,000 gallons at Khulna. Periodical analyses were made of the water supplied, the results of which were generally good at Dacca, Howrah and Burdwan; not always satisfactory at Darjeeling, Kurseong and Berhampore; while at Khulna, Chandpur, Narainganj, Mymensingh and Barisal the water was of indifferent quality: the improvement of the quality at the last mentioned places is, however, mainly a question of the expenditure of money.

Sewerage schemes were prepared for three towns, one of them, for Dacca, by a firm of civil engineers, and good progress was made with the sewerage of Darjeeling. Sketch drainage projects were in course of preparation for 15 towns, and detailed projects prepared for five. The detailed sheme for the central drainage canal of the Howrah municipality, at a total estimated cost of Rs. 6,47,732, was completed and submitted to Government for sanction. Drainage works were

under construction in nine towns. The total capital expenditure on drainage works in municipalities in the province up to the 31st December 1912 was Rs. 12,88,777 of which Rs. 1,34,828 was expended during 1912.

Three B. E. students from the Sibpur College completed their course of training under the Sanitary Engineer and two of them obtained temporary appointments on his staff. Three other students from the College have been placed for a year's training.

Assam.

138. Owing to the reconstitution of Bengal, the province of Assam, shown in last year's report combined with Eastern Bengal, again stands separate. In the province are 11 municipalities, four unions and one station. During the year 1912, the income of the municipalities was Rs. 6,60,258, against 3,94,298 the year before, of which the average percentage spent on sanitation and sanitary works, was 57·4 and 44·4, respectively. The large increase in income was mainly due to grants-in-aid from Government. The increased expenditure on sanitary works from Rs. 2,25,680 in 1911 to Rs. 4,43,907 in 1912 was represented under all the principal heads, but the only large increase was under "water supply", Rs. 1,95,880, due to the construction of the works at Jorhat and Shillong.

Among the principal schemes under preparation or projected are water works for Silchar to cost Rs. 1,16,658; and Jorhat; Rs. 1,16,316; these have been sanctioned by Government; improvement of the Dhubri water supply; renovation and improvement of the Gauhati and Golaghat water works. The new water works at Shillong were completed during the year at a total cost of Rs. 81,290; a regular analysis of the water is carried out which shows the supply to be of exceptional purity.

Among conservancy and drainage schemes, the conservancy system of Silchar is under revision, and a scheme for the thorough revision of the system at Sylhet has been drawn up and submitted to Government for approval. At Shillong an experimental septic tank installation has been erected, and, if successful, will be extended.

Under village sanitation, the five years' programme of work for the improvement of rural water supply, at a total cost of Rs. 1,50,000, in the Gauhati sub-division is approaching completion; a similar scheme for the Barpeta sub-division, to cost Rs. 65,175, is being carried out, and another for the Mangaldai sub-division, to cost Rs. 75,000 has been sanctioned. An important step taken by the local Administration is the allotment of two lakhs of rupees to Local Boards for expenditure on rural water supply during 1913-14. Every Board is required to prepare a comprehensive programme of the work of this nature which can be undertaken wit financial assistance from Government during the five years commencing wit 1914-15.

Sanitary Board.

139. During the year a Sanitary Board was constituted composed of th Inspector-General of Civil Hospitals, as President, th Chief Engineer and Divisional Commissioners, a members, and the Deputy Sanitary Commissioner as Secretary. Two meeting were held during the year. The only executive function of the Board is the distribution of grants placed at its disposal for rural water supplies. The Board drew up proposals for the creation of a cadre of sanitary inspectors, which were accepted by Government, and arrangements are being made for the recruitment and training of candidates.

Great delay was experienced in the preparation of schemes owing to the absence of a Sanitary Engineer. This want has now been met by the creation of such an appointment.

Bihar and Orissa.

140. The year 1912-13 is the first for which a report of the sanitary works in the newly constituted province is given; and comparision with previous years is therefore not possible. There are 54 municipalities in the province and during the year a sum of Rs. 8,29,345 was spent by them on sanitation: more than half, Rs. 4,96,957, was under the head "conservancy", and sums of Rs. 1,67,722 and 1,20,831 under "water

supply" and "drainage", respectively. The most important sanitary works involving capital expenditure in municipalities relate to water supply and drainage. Among the most important water works are those of Gaya, estimated to cost Rs. 6,30,000, which were approaching completion at the end of the year, and Monghyr, estimated to cost Rs. 3,47,000, which were practically complete. A rough project of the Puri water supply scheme at an estimated cost of Rs. 4,25,000 has been drawn up, but cannot be taken up for want of funds: schemes for the water supply of Patna and Bankipore are under preparation and one for Muzaffarpur under consideration.

Of drainage schemes, that of Gaya is estimated to cost Rs. 6,80,000, but cannot be completed for some time. An interesting feature of the scheme is the principle of allowing the effluent from each public latrine and conservancy dumping station to remain under treatment in a septic tank before it passes into the sewer. The drainage project of Puri is under construction and is estimated to cost, when complete, Rs. 2,30,000. The surface drainage scheme of Monghyr, estimated to cost Rs. 2,22,000, is in progress. Drainage schemes for Patna and Bankipore are under preparation and one for Muzaffarpur under consideration.

In regard to the conservancy arrangements of the municipalities, the provincial Sanitary Commissioner remarks that they are not satisfactory, scarcely one of the larger towns possessing either sufficient staff or adequate appliances. Large expenditure to make good deficiencies will be necessary.

Out of the Imperial grant-in-aid of Rs. 6,62,000 for sanitation, Rs. 2,47,049 was allotted during the year, Rs. 1,00,000 of which was towards the Gaya water supply and drainage schemes. A large proportion of the remaining allotments was for surveys and the preparation of projects.

The expenditure of District Boards on sanitation amounted to Rs. 2,19,532. With regard to expenditure on the improvement of rural water supplies, the Bengal system is in force, under which each Board is expected to spend a minimum of Rs. 5,000 a year and the local Government undertakes the refund of one-third of the expenditure up to Rs. 3,000. The matter though of importance, does not appear to receive the attention it deserves. Village sanitation is said not to be neglected, but the means are infinitesimal in comparison with the work to be done.

Sanitary Board.

141. A Sanitary Board was constituted in August 1912. Only one meeting was held during the year, the bulk of the work being carried out by the circulation of files. A Sanitary Engineer joined the province in the preceding April.

Only two water supply projects were under construction during the year—those at Monghyr and Gaya already mentioned—and nine others were under consideration. The scheme for a water supply for Balasore has been abandoned as it was found impossible to finance it. There were 11 drainage schemes in course of preparation during the year, the chief of which were for the surface drainage of Buxar, at an estimated cost of Rs. 1,28,008; Kendrapara Rs. 1,25,134; Bihar Rs. 1,36,355. Plans and estimates were framed for drainage schemes for Ranchi, Chapra, Purulia, Bettiah and Chatra, but have been abandoned owing to the inability of the municipalities concerned to carry them out.

During the year contracts were let and work was in progress on two water supply and six drainage schemes, and a third water supply scheme is ready. The total value of these works amounts to Rs. 20,28,718.

United Provinces.

142. During the year 1911-12, the total municipal income amounted to Rs. 90,10,297 as compared with Rs. 73,23,645 in 1910-11, and the expenditure on conservancy, water supply and drainage was Rs. 32,14,112 or 36 per cent. of income, against Rs. 28,81,297 or 39 per cent. the year before. In towns and villages where the Village Sanitation Act is in force, Rs. 1,35,278 was spent on sanitary improvements against Rs. 38,940 in 1910-11. With a view to encourage village sanitation by the villagers themselves, certain districts were selected by Government and in these committees of villagers or village punchayets, selected or approved by District Boards, are to be entrusted with funds to be spent within village areas. The

Government grant is to be equal, within fixed limits, to that contributed by the District Board concerned.

Activity in sanitary matters was a prominent feature of the year, and this is largely due to generous grants and loans for sanitary purposes given by the Imperial and Provincial Governments and the relief of towns from police charges. Another factor is the greater interest that is being evinced by enlightened members of the Indian community in matters pertaining to sanitation as conducing to better health and greater comfort.

During the year, seven sanitary schemes were finally sanctioned; the chief of these being the Aligarh drainage scheme (cost Rs. 6,30,414), the Bahraich drainage scheme (Rs. 3,50,347) and the Landour drainage scheme (Rs. 2,22,564); eleven schemes were prepared by the Sanitary Engineer and forwarded to the municipalities concerned though not finally sanctioned, among which were the Allahabad water supply improvements (cost Rs. 3,37,371); Muttra drainage (Rs. 2,99,368); and Agra water supply extensions (Rs. 1,12,000): seven schemes were practically completed, though not finally disposed of, the two chief ones being the Etawah drainage, revised scheme (cost Rs. 3,69,000) and Brindaban drainage (Rs. 2,27,000); nine large schemes were begun and are under preparation.

The eight large water works on the whole gave satisfactory results, the only serious breakdown occurred at Allahabad. The demand is everywhere in excess of the supply, but a high standard of purity was maintained at all stations. It is estimated that the total cost of these water works amounts roughly to Rs. 125 lakhs and when improvements and extensions are complete, the cost will be nearly 1½ crores of rupees. Proposals are under consideration for utilizing tube wells at certain places: arrangements have been made for boring tools and pipes and for a staff of borers and an early commencement of work is anticipated.

The Sanitary Engineer's report affords information concerning the many schemes in hand and contemplated, which need not be summarised here, and indicates the active policy in regard to sanitary works in the province. Briefly, the projects in hand and under investigation at present amount in value to a total of 73 lakhs: those urgently needed, but not yet taken up, amount to 27 lakhs; others less urgent and deferred till the more urgent ones are disposed of, amount to over 50 lakhs.

Sanitary Board.

143. The Board held eight meetings during 1912. The amount for sanitary improvements at the disposal of the Board during the year was Rs. 5,16,130, and of this Rs. 4,59,704 was allotted. During 1912-13, the Imperial grant for sanitation was Rs. 8,00,000 and this was distributed between nine schemes, Rs. 3,000 being held in reserve, *viz.*, Muttra drainage (Rs. 2,00,000), Fyzabad-Fatehganj drainage (Rs. 1,12,000), Agra improvement of drainage (Rs. 1,00,000), Cawnpore extension of drainage and paving (Rs. 58,000), Ballia, Jaunpur, Saharanpur and Etawah drainage (Rs. 50,000 to each), Kheri-Lakhimpur drainage (Rs. 27,000) and extensions to the Agra water works (Rs. 1,00,000). In addition special grants were sanctioned for the Agra balancing tank works (Rs. 60,000), Landour drainage works (Rs. 25,000) and construction of a road, sewer and storm water drain in Benares (Rs. 15,000), total Rs. 1,00,000. Of the schemes considered by the Board, administrative sanction was accorded to two for water works, eight for drainage and sewerage, and four "other works," of the aggregate estimated cost of Rs. 18,99,767. Proposals for other schemes were received by the Board, but were either returned for further particulars or deferred owing to the inability of the municipalities concerned to finance them. Other important matters were considered, among them revised rules for the functions and working of the Board; the question of town planning, on which it was decided all schemes of town extension should be classed as sanitary projects to be approved by the Board; the appointment of health officers for municipalities with incomes of less than Rs. 50,000 a year.

Punjab.

144. The provincial sanitary report does not contain information of the income of, and expenditure on sanitation, by municipalities. The liberal grants made by the Government of India will enable the local Government to spend about 33 lakhs on sanitary works during the next three years, so that the province has before it a period of great sanitary

activity. Works of public utility were carried out by private individuals in several districts, but were much more in evidence in the Ambala and Jullundur divisions than elsewhere. The system of rewards for improved sanitation in villages has not been a success; the special rewards for sanitation in the Chenab colony have been discontinued.

Among the principal sanitary works in the province is the Chair water supply extension at Simla, which will provide an extra supply of some 300,000 gallons a day. The pumps for the scheme are to be worked by electric energy. The revised estimate for the scheme amounts to Rs. 5,75,587. The extension of the sewage mains in Simla, estimated to cost Rs. 61,000, is under execution. At Amritsar an estimate for Rs. 45,040 for sinking perforated tubes in all the water supply wells was sanctioned. Sanction was also accorded to a detailed scheme for the underground drainage of a part of the city, to cost Rs. 2,20,000. The work of filling the "Dhabs" at Amritsar, to cost Rs. 1,50,000, sanctioned in 1911, made good progress. The sinking of 11 additional wells for the Lahore water supply head-works was practically completed, while the sanitary fittings, water supply and sewage disposal works for Queen Mary's College were completed at a cost of Rs. 85,186. An underground drainage system for a part of Lahore city, to cost Rs. 71,431, has been sanctioned. Other works included improvements to the water supplies of Ambala, Lyallpur and Khusab, and completion of the water supply for new Dera Ghazi Khan. The extension of the drainage in Lyallpur, and the construction of the drainage works in Karnal were completed, and some progress was made with the drainage scheme of Fazilka.

During the year 15 estimates, aggregating Rs. 6,60,000, were sanctioned in addition to that of the Simla water works extension already referred to. The Sanitary Engineer scrutinized and approved 25 estimates, the total value of which amounted to Rs. 13,92,000. In addition 12 detailed estimates were prepared or recast by the Sanitary Engineer, of the value of Rs. 2,90,000, and four rough estimates of the value of Rs. 16,00,000 were prepared for administrative sanction. Reference is made to a note prepared by the Sanitary Engineer for the guidance of those desirous of having sanitary schemes prepared, and to a pamphlet for the guidance of those engaged in the preparation of surface drainage projects in the Punjab. Both have proved useful and have been in great demand.

Sanitary Board.

145. The constitution of the Sanitary Board was the same as in the preceding year. Four meetings were held. During 1911-12 the Board distributed to municipalities and District Boards, all but nine annas of the grant of Rs. 1,50,000 placed at its disposal, of which the largest grant was of Rs. 40,000 to Lahore for sinking 11 additional wells. Of the similar grant for 1912-13, the Board had allotted Rs. 66,259 up to the end of December 1912, the largest sum being Rs. 39,000 for the Chiniot drainage scheme. The Board considered, and after approval, submitted for administrative sanction, 15 schemes, the more noticeable of which were, Sialkot water supply (Rs. 4,27,288); Amritsar sewerage (Rs. 2,20,520); Rawalpindi intramural drainage (Rs. 1,69,398); filling of "Dhabs" at Amritsar (Rs. 1,49,997).

North-West Frontier Province.

146. No sanitary work of capital importance was carried out in the province during the year. Municipalities spent on sanitation a sum of Rs. 1,14,977, the four largest of these bodies incurring expenditure, chiefly on water supply, drainage and paving. Of the Government grant-in-aid for sanitary works in 1911, Rs. 63,483 remained unexpended. The grant of Rs. 1,25,000 made in 1912 was allotted between the Peshawar city improvement scheme (Rs. 1,06,000), and on sanitary improvements in the Khyber Militia posts. The former includes several much needed improvements.

Central Provinces and Berar.

147. The provincial sanitary report does not afford information as to the income of municipalities and the expenditure on sanitary works. The local Administration notes that for 1912-13 a sum of Rs. 7,17,000 was provided in the provincial estimates for grants to municipalities for works of sanitary improvement. The largest grants made during the year were of Rs. 1,00,000 and Rs. 78,000, respectively, for the drainage schemes under construction in Nagpur and Wardha. Of the total assignment, Rs. 3,12,032

lapsed, but none the less it is said the progress made during the year has not been unsatisfactory. The extreme urgency of the demand for water supply has led to the temporary postponement of drainage schemes, and while some water supply projects are set down for early construction, the only drainage schemes likely to be proceeded with in the near future are those for Jubbulpore, and possibly, Harda.

The following information in regard to water and drainage works under construction or investigation, has been taken from the report of the provincial Sanitary Engineer.

Nagpur water works.—All the principal works had been completed before the end of 1911, and during 1912 certain subsidiary works were carried out. The catchment area of the Gorewara storage lake was finally cleared of habitations and the fencing completed.

Hinganghat water works.—A scheme to improve the yield of the well from which the town water supply is drawn, estimated to cost Rs. 22,887, was taken in hand.

Raipur water works.—The extension of the infiltration gallery at the head-works to improve the filtered supply, to cost Rs. 45,832, has been sanctioned.

Improvements were made to, or estimates prepared to improve, the water supplies at *Khandwa, Burhanpur, Amraoti town, Amraoti camp and Wadali.*

In regard to water supply schemes under investigation, or for which projects have been prepared, are—a project for Arvi town to cost Rs. 4,60,000: a project for providing Amraoti with an adequate and reliable water supply, estimated to cost nearly Rs. 9,00,000, which for the present is considered prohibitive in cost: re-casting of the Wardha water supply, estimated cost Rs. 3,50,000: supplementary water supply schemes for Akola, Khandwa and Burhanpur: a new scheme for Buldana; and preliminary investigation of supplies to 7 towns.

The drainage schemes under construction are those at Nagpur, estimated cost Rs. 16,00,000, of which Rs. 3,00,000 had been allotted and Rs. 1,74,419 spent up to the end of 1912: Wardha surface drainage scheme, estimated cost Rs. 1,93,000, of which Rs. 1,28,000 has been allotted and Rs. 47,153 spent. The Khamgaon surface drainage, estimated cost Rs. 2,79,976, which has been reduced to Rs. 2,19,000 by omitting septic tank latrines, has been sanctioned, and work is to commence as soon as arrangements are completed. Several drainage schemes are under contemplation, but as already mentioned, only two are likely to be proceeded with in the near future.

Sanitary Board.

148. A Sanitary Board has been constituted for the province, and is said to have done useful work in connection with sanitary schemes and methods of financing them. The Board has also prepared a useful programme of works to be undertaken in the immediate future.

Madras.

149. The number of municipalities in the presidency remained unaltered during 1912. Their expenditure on sanitation amounted to Rs. 16,33,189, or 67·7 per cent., of the total assignment, as compared with Rs. 14,68,751, or 62·2 per cent. in 1911, and was devoted to the improvement of town sites, water supply, conservancy, sanitary arrangements at fairs and festivals, on markets, slaughter-houses, latrines, drains, etc. The provincial Sanitary Commissioner considers that a steady advance has been made in sanitary progress during the year, but that in view of the improved financial position, redoubled efforts should be made to improve the sanitation of both rural and urban areas to retain the forward position claimed for the presidency.

The addition of Periyakulam and Vizianagram to the list of towns provided with a piped water supply, has raised the number of such towns from 19 to 21. Although more than two-thirds of the municipal towns are not yet in possession of a satisfactory drinking water supply, it is claimed that this is not due to indifference or apathy, as several municipal councils have accepted schemes which are either under execution or investigation, and others are discussing ways and means of financing them. In regard to drainage schemes, there was no advance

on the previous year. Ootacamund is still the only *mufassil* municipal town with a sewerage scheme in working order, but schemes are under investigation for no less than 28 towns, with, in addition, improvements to the Ootacamund scheme.

In connection with improvement schemes by municipalities with the aid of provincial funds, it is said that progress is hindered by the absence of competent public works officers to draw up plans and estimates and to supervise the execution of works; proposals to secure that every municipality should employ a duly qualified officer capable of undertaking such work are under consideration.

Sewage farming was in force in 21 municipalities, the method employed usually consisting of the application of crude sewage to land by broad irrigation. The crops grown consist of English and country vegetables, various kinds of grasses, tobacco, plantain, sugarcane, cocoanut, etc., and reports show these thrive on sewage irrigation. Financially, however, sewage farming is a failure, but the results in Vizagapatam and Tanjore afford evidence that with care and attention such farms could be worked on more profitable lines than at present.

For all District Boards the assignment for sanitation amounted to 8·2 per cent. of the estimated income against 9 per cent. in the preceding year. The expenditure, however, was only 45·2 per cent. of the allotment, against 42·6 per cent. the year before, so that a large proportion of the provision was not utilized. Of the total allotment of Rs. 12,89,652, a sum of Rs. 1,10,679 was spent on water supply and Rs. 3,52,025 on conservancy. There was no appreciable advance in regard to the condition of water supply, drainage and conservancy in rural areas. The chief need in rural areas is a fairly pure water supply and attention to conservancy. At present nowhere in rural areas is there a piped water supply or comprehensive sewerage system.

In regard to sanitary works in the presidency, the report of the Sanitary Engineer, which now refers to the financial year, shows that during 1912-13 investigations were completed for 7 water supply and 8 drainage schemes, and others were on hand. Water supply schemes for 6 towns were under execution by the Public Works Department, the largest of these being for Negapatam, to cost Rs. 8,39,390, and four under execution by the Sanitary Engineer. During the year the Sanitary Engineer drew up 8 type designs and scrutinized 514 proposals for minor sanitary works of the value of Rs. 17,50,754. The growth of work of this description is attributed to the financial assistance given to local bodies and to the increased interest shown by them in the improvement of sanitation.

Sanitary Board.

150. There was no change in the constitution and functions of the Sanitary Board during the year, the latter being advisory. After prolonged consideration, the type designs (18 in all) for the component buildings of a *moffasil* General Hospital, admitting of adaptation for expansion or curtailment, were completed during the year. Standard designs were issued for (1) simple sanitary measures for conserving village tank water supply; (2) a 12-bed main ward for small hospitals; (3) scour pipe for water works; (4) well water supply arrangements. During the year the Board approved of 54 schemes of the estimated cost of Rs. 35,19,576. Of these 32 schemes, estimated to cost Rs. 30,05,372, were for municipalities, and 22 schemes, estimated to cost Rs. 5,14,204, related to Local Fund Boards. Of the total, 39 of the schemes, cost Rs. 1,84,113, were within the Board's powers of final approval; 5 of them, aggregating Rs. 26,035 are reported to have been completed, and 15, estimated cost, Rs. 79,289 were under execution at the close of the year. Among the works approved by the Board the largest were, Vellore drainage scheme (estimated cost Rs. 4,07,970), Madura drainage scheme (Rs. 22,00,000), Saidapet water supply (Rs. 1,89,100), Ramesweram water supply (Rs. 1,25,500) and Gudur water supply (Rs. 1,12,800).

Bombay.

151. During 1912-13, the number of city and town municipalities was 157, as in 1911-12. The total income of these bodies was Rs. 1,16,36,120 as compared with Rs. 97,16,431, the year before, and the expenditure on public health improvements was Rs. 32,15,212 against Rs. 25,70,603. Under the stimulus of Government grants, closer attention is paid to sanitation and many improvements in water supply and drainage are being carried out.

During the year 1912 the local Government sanctioned certain allotments from provincial funds, in addition to the Imperial allotment of 7 lakhs of rupees for sanitation. The provincial grants were for carrying out improvements to village water supplies, and those from Imperial revenues were mainly devoted to the improvement of water supplies, village sanitation, the proper equipment and maintenance of dispensaries, and the up-keep of roads and bridges. During the year, 11 new projects were sanctioned and 35 works were either in progress or under investigation. Of the total of Rs. 8,60,828 sanctioned during 1912 for sanitary works, the chief allotments were on account of the Poona city drainage and water supply, Rs. 3,00,000; Bijapur water works, Rs. 1,92,000; Lonavla water supply, Rs. 1,60,000; Surat town, Broach city and Sholapur city improvement schemes, Rs. 50,000, Rs. 35,000 and Rs. 25,000, respectively.

District Local Boards and Taluka Local Boards.—Of these there were 25 and 212, respectively, with a total income of Rs. 71,77,472 during 1911-12, against Rs. 68,32,040 the year before. Of the total income, Rs. 3,90,379, against Rs. 3,52,902 was spent on water supplies and drainage, and Rs. 14,496, against Rs. 24,640, on other works of improvement.

During the year complete sanitary surveys on a uniform plan were made of 55 towns and villages as compared with 52 in the previous year, thus adding to the valuable information now available showing the sanitary defects in the places surveyed.

Sanitary Board.

152. The Board held three meetings during the year. Among other matters considered were schemes for the water supplies of Belgaum, Hubli, (3rd stage), Matheran, Godhra, Nandurbar, further improvements to the Sholapur water supply, and the sewerage of Dhulia. The question of the appointment of a Mechanical Engineer to Government to inspect pumping installations was decided. Of the 11 projects sanctioned by the Board during the year, the chief were the Igatpuri water supply (Rs. 1,12,473); Sangli water supply (revised estimate Rs. 2,60,927); Lonavla and Khandala water supply (Rs. 3,67,801), Karad water supply (Rs. 1,81,039); Bijapur water supply (revised estimate 6,18,245).

In regard to water works in progress during the year, the following is culled from the detailed remarks on each.

Sangli water supply.—The work was practically completed, but a further revision was found necessary owing to heavy expenditure on the filtration gallery in the river bed, pump well, engine and boiler-house, steel-tower tank, etc., and the revised estimate is Rs. 3,02,426 approximately.

Hubli water supply.—The works for increasing the storage capacity of the Unkal tank, filtration works and new service reservoir at a higher level were completed, but owing to the tank running dry, the municipality put up a boring plant to supplement the supply. Work to a depth of 216 feet has not yet struck any artesian supply. A project for a supplementary tank on a better site than that sanctioned, is under preparation.

Bijapur water supply.—Rs. 2,45,401 was spent during the year: all the headworks were completed, except for the erection of the pumping machinery, engine and boiler-house: the former is awaited. The work of the raising main is in progress.

Surat water works.—The temporary bund across the river Tapti to keep out tidal water, proved unsatisfactory and the municipality are seeking advice from the Board in the matter.

Among drainage schemes may be mentioned the Poona city drainage, of which the main sewers up to 23,128 feet, out of the estimated length of 33,130 feet have been constructed, and of the branch sewers 24,923 feet have been constructed of the estimated total of 147,947 feet. The work so far has been of the deepest and most difficult part, mostly in very hard rock. The balancing tank of the Ahmedabad drainage has been further improved by the introduction of two sluice valves to the suction pipe and an additional screen in the silt chamber. The extension of the drainage to the northern portion of the town, at a cost of 6 lakhs,

is under contemplation. Surveys for an underground drainage scheme for Hyderabad have been carried out.

During the year three steam and three hand-power Calyx Drills were at work for investigating water supplies. Much difficulty was experienced in sinking the deep bore holes, but the services of an expert Boring Engineer have been secured and, it is considered, work should now progress more satisfactorily.

Experiments in sewage installation were carried out at Poona by Major F. H. G. Hutchinson, I.M.S., and a report on the subject was laid before the Board.

The Agricultural Engineer inspected the pumping installations, and in November 1912 the newly appointed Mechanical Engineer to Government took over his duties.

153. Out of a total income of Rs. 1,68,00,000, a sum of Rs. 45,00,000 was spent by the various municipal and local funds on civil sanitary works during 1911-12 : of this 14 lakhs were spent on water supply, 6½ lakhs on drainage and 13½ lakhs on conservancy. The proportion of income spent on sanitation from municipal funds during the year was 37·49 against 38·83 per cent. in the preceding year, from Town and District Funds 32·25 against 25·85, and from District Cess Funds 5·77 against 4·19.

Burma.

Of the 7 lakhs of rupees granted by the Government of India to the provincial Government during 1911-12 for the improvement of sanitation, 1½ lakhs was assigned for the rebuilding of the Pegu bazaar on improved sanitary lines, 1 lakh for the water supply scheme of that town, and 4½ lakhs for the Mandalay drainage scheme. Of the 6 lakhs granted by the Imperial Government during 1912-13, 2 lakhs were allotted for the establishment of a bacteriological institute in Burma, 2 lakhs for completing the Pegu water supply scheme, half a lakh for a new bazaar at Paungde, and 1½ lakhs for rebuilding the bazaar at Toungoo.

The report of the Sanitary Engineer for 1912 shows that projects for seven water supply schemes were drawn up during the year. Of these the scheme for Pegu, estimated to cost Rs. 3,16,833, was returned for further revision : the Mandalay scheme, to cost Rs. 12,94,833, is in abeyance owing to difficulty in financing it: the scheme for Bassein has been held up pending experiments to devise means for utilizing as a source of supply the water soaking away from leakage in the reservoir which has been completed: the scheme for Monywa, to cost Rs. 1,10,732, has been sanctioned. Drainage projects were prepared for 11 towns—for two of them (Akyab and Myaungmya) in two sections. The more important of these were, Toungoo, to cost Rs. 1,51,034, Henzada, cost Rs. 5,75,000 and Thongwa, cost Rs. 1,20,000. The Sanitary Engineer examined and reported on certain schemes and carried out experimental tube well borings at three places.

154. In June 1912, the provincial Sanitary Board was replaced by Divisional Sanitary Boards. The Divisional Boards met once at Mandalay, twice at Moulmein and once at Syriam. At these meetings questions concerning local sanitary matters were considered.

Sanitary Board.

155. During the year 1912-13, the expenditure on ordinary military works was Rs. 86,17,716, as compared with Rs. 87,04,100 during 1911-12, and on special demands of military works, Rs. 31,98,947, as compared with Rs. 33,76,641.

Military Works.

Particulars regarding new works and improvements in some of the more unhealthy stations will be found in Tables IV and XVI.*

* Standard Tables of the Sanitary Commissioner's Annual Report.

SECTION VIII.

GENERAL REMARKS.

Laboratories.

156. *The Central Research Institute, Kasauli*, satisfactorily met the expanding demands for curative sera and vaccines, all of which, with the exception of antitetanic and antistreptococcus sera, are prepared in the laboratory. Both Government and private institutions are supplied. The amount of each serum and vaccine prepared at the Institute, and issued during 1911 and 1912, is tabulated below.

—	1912	1911.
1. Antivenomous serum	46,680cc	30,600cc
2. Antidiphtheritic serum	12,000cc	9,480cc
3. Antidysenteric	1,660cc	2,040cc
4. Normal horse serum	c 4 c	1,900cc
5. Tubercle vaccine	2,534cc	1,334cc
6. Typhoid vaccine	2,849cc	14,288cc
7. Staphylococcus vaccine	433cc	425cc
8. Gonococcus vaccine	389cc	200cc
9. Acne vaccine	68cc	106cc
10. Mixed acne and staphylococcus vaccine	47cc	...
11. Miscellaneous vaccines	599cc	265cc
12. Von Pirquet's cutaneous test (solutions A and B) ...	1,013 tubes	1,041 tubes

Pathological and other specimens examined during the year also show an increase in numbers and evidence the increasing usefulness of the Institute from this point of view. They include—histological examination of tumours, etc., 52; examination of blood specimens for either malaria, opsonic index, Widal's reaction or Wasserman's reaction, 719; examination of material for preparation of autogenous vaccines, 38; water samples for bacteriological examination, 8.

One of the most useful sides of the work of this Institute is the one devoted to teaching. Five classes of instruction in clinical bacteriology and technique were held during the year. Each course lasts one month. Twenty-two Indian Medical Service officers and thirteen military assistant surgeons availed themselves of these classes in 1912.

Two classes of instruction in malaria were held by the Central Malaria Bureau of the Institute during 1912, one in Amritsar, the second in Delhi. Each course lasted a month and a half, and were attended by a total of 12 Indian Medical Service and 9 Royal Army Medical Corps officers, and 36 other Medical Officers and Subordinates. In addition to teaching, the Malaria Bureau has been engaged in completing its type collection of all known Indian anophelines, and in making as many duplicate sets as possible for the use of students working at the Bureau, as well as for institutions and colleges both in India and abroad. Specimens of anophelines and culicines are sent to the Bureau in large numbers for identification. Attention has also been paid to collecting and studying varieties of fish that are known feeders on mosquito larvæ.

The Bombay Bacteriological Laboratory, Parel, Bombay, still serves its dual function of plague laboratory for all India and the provincial bacteriological laboratory. It is the former which absorbs most of its energies. Though the demands for anti-plague vaccine were considerably less than in the record year 1911 when 1,211,170 doses were sent out, the output for 1912 is represented by the high figure of 727,377 doses. The decrease was coincident with the still more marked decline in plague incidence that 1912 exhibited, as compared with the previous year and is doubtless chiefly explained by it. Since this laboratory was opened in 1896, ten and a half million doses of anti-plague vaccine have been manufactured and distributed by it.

The Director's report for 1912 contains numerous statistics collected during the year bearing on the subject of the efficiency of the vaccine as a plague prophylactic. Some of these have been compiled with great care and show that inoculated persons are more than three times less likely to become infected with plague than the uninoculated, and that if infected, they run a two-fold better chance of surviving the attack than if they had not submitted themselves to inoculation. Once again no untoward results were recorded as the result of inoculation.

Research work in connection with plague carried out during the year dealt with the efficacy of some common rat poisons, and experiments with hydrocyanic acid gas as a disinfecting agent on a large scale for the purpose of destroying rats and fleas in cargo, especially grain. These latter experiments have not yet been completed.

The Plague Research Commission have their head-quarters in the Laboratory. The Advisory Committee, under whose auspices the Commission work, have issued their seventh report on plague investigation in India. The report consists of sixteen papers which cover a wide range of subjects directly or indirectly bearing on the etiology and prevention of plague. The immunity to plague that the City of Madras has enjoyed is the subject of the first paper. No very definite conclusions are arrived at and further discussion of this interesting subject is reserved by the Committee until the publication of the results of the enquiry that has been in progress in other parts of the Madras Presidency. As far as enquiries have gone, it would appear that there is nothing in the conditions under which the people live, or in the rat and flea prevalence in the city, that is capable of explaining the remarkable degree of immunity that the City of Madras has enjoyed. Climatic conditions for at least three months in the year also appear to be not unfavourable to plague. It would appear probable that some factor or factors, possibly connected with its trade relations, are responsible for having kept infection out of the city. It is unlikely that the system whereby arrivals from plague infected parts of India are passported and subjected to a certain amount of surveillance in the Madras Presidency, is, at present at any rate, a factor of any importance in this direction. Further reports of the Committee on this subject are awaited with interest.

The paper dealing with the subject of immunity to plague of wild rats in India (chiefly *Mus rattus*) demonstrates the interesting fact that rats from different parts of India show very varying degrees of immunity. Moreover, rats caught in places in which epidemic plague has not occurred are very susceptible; rats from places that have suffered moderately, less so, whilst rats from places that have suffered from repeated epidemics have a very high degree of immunity to plague. This immunity appears to be transmissible from the rat to its offspring.

The Plague Commission have also conducted an enquiry on the subject of the distribution of plague in the districts of the United Provinces of Agra and Oudh. They have completed their observations but their report has not yet appeared. From the annual report of the Director of the Bombay Bacteriological Laboratory who anticipates some of their findings, it appears that grain and the grain trade appear to be factors of very great importance in the spread of the disease. Further discussion of this subject is postponed till after the appearance of the Advisory Committee's report.

Daily examination of rats caught and found dead within the confines of the Bombay Municipality is still carried out at the laboratory. During the year, 137,840 rats were thus examined and of these 7,662 were found to be plague infected.

As the provincial laboratory, the institution fulfils a most useful function as is evidenced by the large amount of routine work in the examination of pathological material, disinfectants, food stuffs, water, etc., that is therein carried out. The work done in this connection continues to increase year by year.

In addition to this routine the staff have carried out research work in connection with the following diseases, plague, diarrhœa, dysentery, cholera, tuberculosis, leprosy and dracontiasis. Captain Morison, I.M.S., was placed on deputation to undertake an investigation into the prevalence of diarrhœa in Poona. The inquiry has not yet been completed, but as far as it has gone it incriminates the water supply. In a fair percentage of cases bacillii of the dysenteric group (Shiga or Flexner) or of Morgan's No. I bacillus, organisms that in England and America have been incriminated as the causative agent of epidemics of diarrhoea, are present.

During the outbreak of cholera in Bombay City in the summer of 1912, Captain Gloster, I.M.S., made some interesting observations on the subject of cholera vibrios. From the excreta of 15 patients with the symptoms of the disease, vibrios were isolated. The vibrios from eleven of these patients were agglutinated by cholera immune serum in high dilutions; those from the remaining four patients were not so agglutinated. There were no constant cultural or morphological differences between these two varieties. All the non-agglutinating strains were pathogenic to guinea-pigs (when injected intraperitoneally) and the two of them, that were so tested, were virulent for pigeons. Both agglutinating and non-agglutinating varieties hæmolysed human red blood corpuscles, whereas the latter variety alone hæmolysed goat's red cells. This latter consideration led Captain Gloster to the conclusion that it is very unlikely that the non-agglutinating variety is a true cholera vibrio that has lost its power of reacting with cholera serum.

Observations made on the subject of tuberculosis were directed chiefly to the determination of the extent that tuberculosis occurs amongst cattle in Bombay. As far as they have gone, they seem to show that bovine tuberculosis is at any rate very rare and not an important source in Bombay of human infection.

As regards leprosy, observations as to the therapeutic value of a vaccine prepared from a streptothrix isolated by Major Williams, I.M.S., have been continued. The laboratory has sent out a large quantity of the vaccine and the reports from the users exhibit a remarkable divergence of opinion as to its utility. Some have found it to act as a specific for the disease, whilst others have obtained no success at all. The laboratory staff's experience with the vaccine has been on the whole satisfactory. Whereas some observers have noted no reaction even after repeated large doses, others state that it is not possible to continue the administration of large doses without producing severe reactionary symptoms. The treatment has to be carried on for a long period in most cases. The question of its utility must still be left *sub judice*.

Dr. Turkhud of the laboratory staff is continuing his researches on the subject of dracontiasis. Leiper's observation that the larvæ of the guineaworm gains access to the body cavity of the cyclops by way of the intestinal tract of the latter has been confirmed: the cyclops appears to swallow the larvæ as food. In the water of a well in a village near Bombay, cyclops, naturally infected with the larvæ of filaria medinensis, were found in large numbers. The inhabitants of this village suffer very severely from guineaworm. Experimental feeding of monkeys with infected cyclops was carried out with, hitherto, negative results.

The King Institute of Preventive Medicine, Madras, consists of a Vaccine section and a Micro-biological section. The work done in the former has been referred to in the Vaccination section of this report. In the latter much useful

work was done during the year. Captain Cragg continued his entomological researches into the morphology and mechanism of the mouth apparatus in blood sucking flies, the nature of the digestive process in blood feeders and the dipterous fauna of the neighbourhood. His results have been published as numbers of the Scientific Memoirs. Captain Patton continued his researches on kala azar and some of his results were published in a paper in the Indian Journal of Medical Research for July 1913.

The systematic examination of actual and prospective water supplies of the Madras Presidency was continued on the same lines as in 1911. The results do not lend themselves to summary; they are published as appendices to the annual report of the Institute. There were 620 samples of water submitted to bacteriological analysis.

Though the number of pathological samples sent for examination is less than in the previous year, certain classes of these show a very marked increase; there were, for example, 481 samples of blood sent to the laboratory for Wasserman's test for syphilis as compared with 11 in the previous year.

Pasteur Institute, Kasauli.—During 1912 a larger number of persons than in any previous year underwent anti-rabic treatment. There were 3,548 patients against 2,268 the year before. Four hundred were Europeans. The steady increase in the numbers of patients treated year after year is most noteworthy. From the point of view of anti-rabic treatment this is now the largest Institute in the world. Patients came from all parts of Northern India, Burma, Kashmir, Rajputana and Central India. Of the total number treated 45 succumbed to hydrophobia; five dying during their treatment, twenty others within fifteen days of its completion: the remaining twenty died after a longer period of time than fifteen days from the termination of treatment. This last class constitute the "failures of treatment". The percentage failure rate was thus 0·56 as compared with 0·6 in 1911.

The increase in attendance in 1912, according to the Director, is largely accounted for by the action of the Institute itself in its attempts to gain statistics of people bitten by rabid animals who do not submit themselves to treatment. Each individual on his arrival is closely questioned about the number of persons bitten at the same time as himself and inquiries are then made with regard to such from the place whence he came. These inquiries frequently lead to other bitten persons being persuaded to avail themselves of treatment, who otherwise might have remained in ignorance of the existence of such institutes. This attempt to collect statistics for untreated individuals was only commenced in 1912. There is no evidence to show that rabies was more prevalent in Northern India than in former years.

As the Punjab provincial laboratory, the Pasteur Institute of Kasauli also reports a large increase in the work carried out; 1,507 specimens were examined compared with 1,052 in 1911. The Director and his staff also carried out experiments on the preparation and concentration of antivenene and other problems pertaining to snake bite. The results of these experiments will appear in the Indian Journal of Medical Research.

The annual report of the *Pasteur Institute of Southern India, Coonoor*, shows that this Institute also is each year becoming better known and more frequented. During the year, 1,240 patients underwent anti-rabic treatment, an increase of three hundred over the number in 1911. A part of this increase is attributed to the unusual prevalence of rabies in Quilon and adjacent parts of Travancore. Fourteen patients died of hydrophobia, 13 of these after the lapse of more than fifteen days from the completion of treatment. The failure of treatment rate was thus 1·05 per cent. All the fatal cases were the victims of deep bites on the bare skin: all but three had multiple bites: in four cases the bites were not cauterised at all and in six others they were cauterised late, *i.e.*, 24 hours or more after the bite. An attempt is being made by this Institute also to obtain statistics bearing on the mortality from hydrophobia of bitten persons who do not submit themselves to treatment. The staff of the Institute have, in addition

to their rabies work, carried out an inquiry into the etiology and prevalence of elephantiasis in Cochin. Their report on this subject is shortly to be published.

Instruction in Malaria.

157. Two classes of instruction in malaria were held at Delhi during 1913, both being conducted by Captain E. C. Hodgson, I.M.S. The first extended from the 15th March to the 26th April and was attended by 33 candidates, composed of 10 civil and 8 military medical officers and 7 civil and 8 military medical subordinates. The second class assembled on the 15th September and concluded on the 25th October. It was attended by 26 candidates—3 civil and 5 military medical officers and 10 civil and 8 military medical subordinates.

These classes are in future to assemble annually on the 15th March and 15th September.

Sanitary Conference.

158. The first and second All-India Sanitary Conferences were referred to at length in the last report. The third Annual Conference will take place in Lucknow in January 1914 after this report has gone to press. These Conferences appear to be gaining in popularity and usefulness and the forthcoming Conference promises to be on a larger scale than either of its predecessors from the point of view of the number of delegates as well as of the number of contributions sent in.

Indian Research Fund.

159. In the last report the inauguration of the Indian Research Fund Association and its objects were described. In July 1913, the Association issued the first number of the Indian Journal of Medical Research. This Journal, the first of its kind in India, will issue four times a year. It has supplanted "Paludism." Contributions which under the former regime would have issued as separate numbers of the Scientific Memoirs will, unless prevented by their length or unsuitability of subject matter, now find a place in the Journal's pages. It is edited by the Director-General, Indian Medical Service and the Sanitary Commissioner with the Government of India, assisted by a strong staff of collaborating editors. That the Journal meets a real want and does so adequately, is evidenced by the gratifying reception that has been accorded its appearance. The scope and objects of the Journal are fully described in the first number as are also the Proceedings of the Research Fund Association.

Scientific Memoirs.

160. Since the issue of the last report only the following number of the Scientific Memoirs has been published :—

No. 60. *Studies on the Mouth Parts and Sucking Apparatus of Blood-Sucking Diptera. No. (4) The Comparative Anatomy of the Proboscis in the Blood-Sucking Muscidæ*, by Captain F. W. Cragg, M.D., I.M.S.

Table No.				PAGES.
I.—	EUROPEAN TROOPS.—	Summary.—	Sickness and Mortality by Geographical Groups.	84-85
II.—	„	„	Ratios of Armies	86
III.—	„	„	„ „ Geographical Groups... ...	87
IV.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	88
V.—	„	„	Statistics of Officers.—Sickness and Mortality among Officers of British Army.	89
VI.—	INDIAN TROOPS—	Summary.—	Sickness and Mortality by Geographical Groups.	90-91
VII.—	„	„	Ratios of Armies	92
VIII.—	„	„	„ „ Geographical Groups	93
IX.—	PRISONERS.—	Summary.—	A.—Sickness and Mortality by Administrations.	94
	„	„	B.—Sickness and Mortality by Geographical Groups.	95
X.—	„		Ratios of Administrations	96
XI.—	„	„	„ Geographical Groups	97
XII.—	GENERAL POPULATION.—		Provincial Birth and Death Statistics...	98
XIII.—	„	„	Births	99
XIV.—	„	„	Deaths...	99
XV.—	„	„	„ in Towns and Rural Circles ...	100
XVI.—	„	„	„ according to Age	100
XVII.—	„	„	„ „ „ Cause	101
XVIII.—	„	„	„ by months	102
XIX.—	„	„	Ratio of Deaths according to months...	102
XX.—	„	„	Deaths from Cholera, by Provinces, 1880-1911.	103
XXI.—	„	„	Deaths from Cholera, by months, in 1912	104
XXII.—	„	„	Details of distribution and occurrence of Cholera in 1912.	104
XXIII.—	„	„	Mortality from small-pox	105
XXIV.—	„	„	„ „ Fever	106
XXV.—	„	„	„ „ Dysentery and Diarrhœa	107
XXVI.—	„	„	„ „ Plague	108
XXVII.—	„	„	„ „ Respiratory Diseases...	109
XXVIII.—	„	„	Vaccination	110

TABLE NO. I.—*Summary, Sickness and*

Groups.	Years.	Average strength.*	Ratio per: Constantly sick.	Invaliding.	Influenza. A	Influenza. D	Cholera. A	Cholera. D
Group I.—Burma Coast and Bay Islands	1901-1910	1,200	58	19·9	8·6	...	...	·08
	1911	1,210	27	8·3	19·0	...	...	...
	1912	1,195	39	4·2	...	...	...	...
„ II.—Burma Inland	1901-1910	1,919	58	21·6	1·8	...	1·4	1·04
	1911	1,219	37	...	...	...	...	...
	1912	1,207	34	3·3	...	...	...	...
„ IV.—Bengal and Orissa	1901-1910	1,843	62	34·1	12·5	...	·7	·49
	1911	1,939	27	4·6	...	...	...	...
	1912	1,978	29	10·1	...	...	·5	...
„ V.—Gangetic Plain and Chutia Nagpur	1901-1910	6,497	52	23·5	4·1	...	·7	·54
	1911	6,012	30	12·1	14·6	...	4·3	2·00
	1912	5,897	28	7·3	6·3	...	·3	·17
„ VI.—Upper Sub-Himalaya	1901-1910	13,126	54	23·5	7·6	...	·4	·27
	1911	14,142	29	7·9	2·8	...	·6	·35
	1912	13,430	31	6·9	7·2	...	·4	·22
„ VII.—North-Western Frontier, Indus Valley and North-Western Rajputana.	1901-1910	4,801	53	30·1	39·4	·02	·3	·31
	1911	5,600	34	6·8	7·3	...	...	...
	1912	5,505	32	7·4	3·4	...	...	...
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1901-1910	5,798	58	29·6	5·8	...	·1	·05
	1911	6,009	33	8·0	1·5	...	...	...
	1912	5,923	33	10·5	5·1	...	1·0	·68
„ IX.—Deccan	1901-1910	9,951	51	21·4	2·8	·01	·5	·34
	1911	11,240	27	5·3	·9	...	·4	·36
	1912	11,664	28	6·5	1·9	...	·4	·17
„ X.—Western Coast	1901-1910	1,517	55	20·4	1·9	...	·1	...
	1911	1,609	29	7·5	1·9	...	...	...
	1912	1,509	37	8·6	4·0	...	...	...
„ XI.—Southern India	1901-1910	3,512	55	20·6	2·4	...	·2	·09
	1911	3,259	35	8·0	6·8	...	...	...
	1912	3,276	28	4·3	19·9	...	...	...
„ XII (*a*).—Hill Stations	1901-1910	10,778	41	17·7	6·4	·01	·3	·17
	1911	12,196	25	5·7	3·4	...	...	...
	1912	12,014	22	5·8	2·2	...	...	...
„ XII (*b*).—Hill Convalescent Depôts and Sanatoria ...	1901-1910	3,620	66	34·3	4·1	...	·2	·11
	1911	3,718	38	9·7	·3	...	...	...
	1912	3,362	39	6·8	1·7	...	...	...
India	1901-1910	68,663	52	24·4	7·5	·01	·5	·33
	1911	72,371	29	7·1	3·9	...	·1	·29
	1912	71,601	29	6·7	4·5	...	·3	·14

* The decennial ratios are worked on the total strength of the ten year period.

Mortality by Geographical groups.

MILLE OF STRENGTH.

A.—ADMISSIONS FROM

D.—DEATHS FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All Causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·6	...	2·3	·42	115·1	·67	110·3	...	1·2	·25	28·6	1·83	259·1	·08	996·4	9·17
...	...	·8	...	30·6	...	111·6	...	1·7	...	3·3	...	52·9	·83	441·3	6·61
...	...	...	...	76·2	...	226·8	·84	·8	...	·8	...	77·8	...	719·7	5·20
·1	...	4·4	1·35	223·5	1·09	55·3	...	2·0	·52	11·4	·31	195·7	·21	970·2	8·80
...	...	1·6	...	55·8	...	114·0	...	...	...	10·7	...	114·8	...	676·0	4·92
...	...	...	...	55·5	·83	47·2	...	1·7	...	9·1	...	107·7	...	553·4	1·66
·8	·11	5·9	1·03	184·7	·76	62·2	...	3·6	·81	30·8	·81	252·5	·11	968·8	13·56
...	...	2·1	...	61·4	...	84·1	...	3·1	·52	16·5	·52	74·3	...	459·5	5·16
...	...	3·0	1·01	38·4	...	17·7	...	1·5	·51	1·0	...	90·5	...	463·6	7·58
1·3	·12	17·9	3·38	135·4	·23	70·7	...	2·9	·35	16·0	·58	148·0	·08	814·9	11·34
...	...	9·1	·50	51·7	...	53·6	...	3·3	1·00	10·6	·50	63·5	...	526·4	9·65
·2	...	7·1	·68	30·7	·17	48·2	·17	1·2	...	2·7	·34	66·8	...	498·0	6·27
·5	·02	17·9	3·92	262·5	·48	42·8	·01	4·8	·62	11·0	·57	130·7	·08	927·7	11·22
...	...	3·0	·25	81·9	·07	24·6	...	2·1	·14	4·3	...	46·5	·07	542·1	4·60
·4	·07	2·6	·52	95·0	·07	17·4	·07	2·7	·37	3·4	·37	49·6	...	640·2	4·54
·9	·01	11·6	2·85	360·1	·37	65·8	·04	4·7	·48	7·3	·08	121·2	·04	1,065·3	16·91
...	...	4·1	·89	137·5	·18	41·8	...	4·5	·36	6·2	·36	48·6	...	830·9	5·18
·4	...	·6	·36	154·8	·36	25·6	...	4·4	·54	1·8	...	56·1	·18	793·3	4·72
1·4	·05	21·0	5·24	349·0	·41	25·0	·07	3·4	·43	15·3	·79	170·6	·09	1,043·3	13·00
...	...	2·7	·33	165·3	...	6·0	...	2·0	·17	5·3	...	51·1	...	625·6	4·49
·7	...	1·2	·34	111·6	·17	6·4	...	2·5	·51	6·8	·34	52·8	...	621·8	5·07
·8	·04	17·6	3·45	141·3	·60	30·4	...	2·8	·26	18·5	·45	185·6	·12	807·7	9·43
...	...	5·6	·44	81·6	·09	15·6	...	1·6	·18	9·7	·36	56·4	...	428·6	4·18
...	...	3·4	·34	94·7	·34	13·1	...	1·5	·17	9·3	·09	55·3	...	507·4	4·80
·8	...	2·3	1·25	164·2	·46	9·0	...	2·8	·99	10·7	·07	210·0	·26	774·6	8·77
...	...	3·7	...	89·5	...	10·6	...	1·1	·62	4·4	·62	98·8	...	448·1	6·84
...	...	1·3	...	118·0	...	4·0	...	·7	·66	13·6	...	112·7	...	522·2	6·63
·5	·06	13·4	2·08	79·8	·14	30·8	...	2·3	·31	17·6	·17	203·6	...	862·6	6·75
...	...	3·7	·16	96·7	...	16·6	...	·6	·31	18·1	·31	89·0	...	692·2	4·30
·9	·11	3·4	·19	76·3	...	5·8	...	·6	·31	9·2	...	87·6	·31	631·0	3·66
·2	...	10·7	·96	95·8	·18	28·5	...	3·7	·56	8·4	·41	108·6	·16	657·4	6·70
...	...	2·8	·25	95·5	·16	12·4	...	1·6	·08	7·3	·49	36·6	...	436·8	3·53
...	...	1·2	·17	52·7	·08	12·5	...	2·1	·17	2·6	...	34·1	·08	392·5	3·33
·2	...	12·0	2·24	196·3	·30	17·0	...	3·5	·41	13·6	·44	133·8	·28	896·3	6·97
...	...	4·3	·27	82·6	·27	17·5	...	1·1	·27	10·0	·27	50·3	...	546·3	6·46
·3	·06	4·5	·89	84·5	·30	11·3	...	2·1	·30	4·8	·30	43·1	...	514·3	5·65
·7	·04	14·1	2·62	197·6	·35	39·6	·10	3·7	·47	14·3	·49	152·5	·12	864·2	16·6
·0	...	3·8	·33	90·2	·08	26·4	...	2·1	·26	7·7	·26	53·1	·03	524·7	4·89
·2	·04	2·6	·39	82·4	·17	21·2	·04	2·2	·28	5·2	·15	55·5	·04	547·6	4·62

EUROPEAN TROOPS.

TABLE No. II.—*Ratios of Armies, 1912.*

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	India.
I.—Strength	36,226	32,175	71,001
II.—Contsantly sick per 1,000 of the average Strength	29·4	30·5	28·9
III.—Admission rate of the year—			
Influenza	4·7	4·4	4·5
Cholera	·2	·3	·3
Small-pox	·3	·1	·2
Enteric Fever	3·1	2·1	2·6
Malaria	70·8	98·7	82·4
Sandfly Fever	52·4	7·6	30·5
Pyrexia of uncertain origin	22·7	19·6	21·2
Tubercle of the lungs	1·5	1·0	1·2
Pneumonia	2·5	1·6	2·2
Respiratory Diseases...	16·8	13·0	15·0
Dysentery	2·8	7·5	5·2
Diarrhœa...	15·1	16·5	15·6
Hépatic Abscess	·6	·7	·7
„ Congestion and Inflammation	9·4	7·2	8·2
Venereal Diseases	52·9	60·1	55·5
All Causes ...	562·6	546·0	547·9
IV.—Death rate of the year—			
Cholera	·11	·19	·14
Small-pox	·06	·03	·04
Enteric Fever	·52	·28	·39
Malaria	·14	·22	·17
Pyrexia of uncertain origin	·06	·03	·04
Heat-stroke	·28	·16	·21
Circulatory Diseases...	·22	·25	·23
Tubercle of the lungs	·28	·03	·15
Pneumonia	·36	·22	·28
Respiratory Diseases	·14	·03	·08
Dysentery	·25	·06	·15
Diarrhœa...	...	...	...
Hepatic Abscess	·36	·31	·32
All Causes ...	5·05	4·41	4·62

TABLE NO. III.—*Ratios of Geographical Groups, 1912.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Buma Coast and Bay Islands.	II Burma Island.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII*a* Hill Stations.	XII*b* Hill Convalescent Depôts, and Sanatoria.	India.
I.—STRENGTH	1,195	1,207	1,978	5,897	13,430	5,505	5,923	11,664	1,509	3,276	12,014	3,362	71,001
II.—†CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH.	39·3	33·9	29·2	28·3	31·5	32·5	32·8	28·4	36·8	28·1	21·9	38·6	28·9
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	...	6·3	7·2	3·4	5·1	1·9	4·0	19·9	2·2	1·7	4·5
Cholera	...	...	·5	·3	·4	...	1·0	·4	...	...	...	...	·3
Small-pox	...	...	...	·2	·4	·4	·7	...	...	·6	...	·3	·2
Enteric Fever	...	...	3·0	7·1	2·6	·9	1·2	3·4	1·3	3·4	1·2	4·5	2·6
Malaria	76·2	55·5	38·4	39·7	95·0	154·8	111·9	94·7	118·0	76·3	52·7	84·5	82·4
Sandfly Fever	...	...	3·5	28·5	66·5	148·6	9·5	14·4	...	2·1	2·0	·6	30·5
Pyrexia of uncertain origin ...	226·8	47·2	17·7	48·2	17·4	25·6	6·4	13·1	4·0	5·8	12·5	11·3	21·2
Rheumatic Fever	·8	9·9	1·5	3·4	4·5	6·4	2·4	3·8	7·6	3·7	8·3	8·0	4·9
Tubercle of the lungs ...	2·5	·8	...	·7	1·7	·5	1·5	·9	·7	...	1·7	2·7	1·2
Pneumonia	·8	1·7	1·5	1·2	2·7	4·4	2·5	1·5	·7	·9	2·1	2·1	2·2
Respiratory Diseases ...	7·5	14·1	13·1	10·9	17·2	21·4	17·7	11·7	13·9	11·0	16·3	14·9	15·0
Dysentery	·8	9·1	1·0	2·7	3·4	1·8	6·8	9·3	13·9	9·2	2·6	4·8	5·2
Diarrhœa	8·4	14·1	13·1	19·7	16·8	17·4	28·2	17·4	8·0	11·6	10·1	8·9	15·6
Hepatic Abscess... ...	·8	...	1·5	1·0	·4	·4	·5	·9	·7	·6	·7	·9	·7
Hepatic Congestion and Inflammation ...	15·1	5·8	9·6	7·8	8·8	5·3	19·9	6·1	6·6	6·4	5·3	12·8	8·2
Venereal Diseases	77·8	107·7	90·5	66·8	49·6	56·1	52·8	55·3	112·7	87·9	34·1	43·1	55·5
ALL CAUSES ...	719·7	553·4	463·6	498·0	640·2	793·3	621·8	507·4	522·2	631·0	392·5	514·3	547·9
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	·17	·22	...	·68	·17	...	...	...	...	·14
Small-pox	...	...	...	...	·07	...	...	...	...	·31	...	·30	·04
Enteric Fever	...	...	1·01	·68	·52	·36	·34	·34	...	·61	·17	·89	·39
Malaria...	...	·83	...	·17	·07	·36	·17	·34	...	...	·08	·30	·17
Pyrexia of uncertain origin ...	·84	...	...	·17	·07	...	...	...	...	...	...	...	·04
Heat-stroke	...	...	...	·17	·30	·36	·68	·34	...	...	...	...	·21
Circulatory Diseases ...	2·51	·83	·51	·34	·07	...	·17	·09	·66	...	·33	...	·23
Tubercle of the lungs ...	...	...	·51	·17	·30	...	...	·09	...	...	·25	·30	·15
Pneumonia	...	...	·51	...	·37	·54	·51	·17	·66	·31	·17	·30	·28
Respiratory Diseases ...	·84	...	...	·17	...	·54	...	...	...	...	...	·30	·08
Dysentery	...	...	...	·34	·37	...	3·4	·09	...	...	...	·30	·15
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	...	...	1·52	·51	·15	·18	·51	·34	·66	·31	·17	·59	·32
ALL CAUSES ...	9·20	1·66	7·58	6·27	4·54	4·72	5·07	4·80	6·63	3·66	3·33	5·65	4·62

TABLE NO. IV.—*Admission and death rates from Enteric fever in stations of over 1,000 strength.*

Stations.	1912.		Decennium, 1901-1910.		Stations.	1912.		Decennium, 1901-1910.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Lucknow	5·5	1·68	25·5	4·23	Colaba	1·7	...	2·0	1·46
Poona	5·3	...	21·1	3·96	Bareilly	1·5	...	12·2	2·17
Secunderabad ...	5·0	·94	17·5	3·70	Ranikhet and Chaubattia	1·2	·62	14·6	2·31
Ambala	4·8	1·91	17·3	3·82	Mhow and Indore ...	1·1	...	24·0	4·90
Fort William ...	4·8	1·61	3·2	·26	Jhansi	1·0	·97	28·3	8·61
Bangalore	4·6	·93	18·2	2·56	Cawnpore	1·0	...	12·0	2·92
Lahore Cantonment and Fort.	3·8	...	18·8	4·04	Ahmednagar ...	1·0	...	14·4	3·32
Belgaum	3·7	...	10·8	2·34	Kirkee	·9	...	22·7	2·69
Meerut	3·2	·46	28·6	6·04	Chakrata	·8	...	6·0	·85
Rawalpindi	2·7	...	17·9	3·28	Peshawar ...	·6	...	20·4	4·96
Jubbulpore	2·7	·45	23·5	4·82	Quetta	·3	...	15·3	2·82
Sialkot	1·9	·93	18·2	4·30	Karachi	...	...	4·6	·96
Nowshera	1·9	·95	9·1	3·30	Rangoon	...	...	2·5	·46

TABLE NO. V.—*Statistics of Officers.*

SICKNESS and MORTALITY among OFFICERS of the BRITISH ARMY in 1912.

	Northern Army.	Southern Army.	India.
STRENGTH	1,148	1,027	2,278
CASES REMAINING FROM 1911	20·0	11·7	3,515,04
	Ratios.	Ratios.	Ratios.
CONSTANTLY SICK	25·5	20·7	22·2
INVALIDING	14·8	19·5	16·2
ADMISSIONS.			
Influenza	20·1	21·4	19·8
Cholera	·9	...	·4
Small-pox	1·7	1·9	2·2
Enteric Fever	7·0	6·8	6·6
Malaria	53·1	43·8	47·4
Sandfly Fever	65·3	11·7	39·1
Pyrexia of uncertain origin	48·8	35·1	40·8
Tubercle of the lungs	·9	1·0	·9
Pneumonia	·9	4·9	3·1
Respiratory Diseases	16·6	17·5	16·7
Dysentery	6·1	13·6	9·7
Diarrhœa	16·6	16·6	21·9
Hepatic Abscess	·9	1·0	·9
„ Congestion	20·0	15·6	21·9
Venereal Diseases	2·6	1·9	2·2
ALL CAUSES.	655·1	566·7	597·9
DEATHS.			
Cholera	...	...	...
Small-pox	...	...	...
Enteric Fever	...	·97	·44
Malaria	...	...	...
Pyrexia of uncertain origin	...	...	...
Heat-stroke	...	...	...
Circulatory Diseases	·87	...	·44
Tubercle of the lungs	...	·97	·44
Pneumonia	...	...	...
Respiratory Diseases	...	...	...
Dysentery	...	...	...
Diarrhœa	...	...	...
Hepatic Abscess	...	...	...
Deaths not reported in Medical returns	...	...	·44
ALL CAUSES	3·48	4·87	4·39
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES	...	...	7·02

TABLE No. VI.—*Summary,*

Groups.	Years.	Average Strength.	RATIO PER. Constantly sick.	Invaliddings.	A.—ADMISSIONS D.—DEATHS Influenza. A	Influenza. D	Cholera. A	Cholera. D
Group I.—Burma Coast and Bay Islands	1901-1910	1,323	22·9	...	2·1	...	...	...
	1911	1,298	30·8	...	3·9	...	...	...
	1912	1,185	29·5	...	·8	...	...	...
,, II.—Burma Inland	1901-1910	3,281	26·5	...	·2	...	·2	·15
	1911	2,568	23·4	...	...	...	...	...
	1912	2,849	22·5	...	4·2	...	...	...
,, III.—Assam	1901-1910	1,068	31·1	...	1·0	...	·4	·28
	1911	884	18·1	...	...	...	...	...
	1912	933	23·6	...	...	...	...	...
,, IV.—Bengal and Orissa	1901-1910	2,248	29·0	...	5·1	...	·2	·31
	1911	2,296	24·0	...	...	...	...	...
	1912	2,332	25·3	...	·9	...	·4	·43
,, V.—Gangetic Plain and Chutia Nagpur ...	1901-1910	6,360	20·2	...	2·7	·02	·9	·57
	1911	6,032	18·9	...	3·2	...	...	...
	1912	6,441	16·9	...	·5	...	2·8	1·24
,, VI.—Upper Sub-Himalaya	1901-1910	18,550	22·1	...	2·2	...	·4	·32
	1911	21,805	20·1	...	3·9	...	·1	...
	1912	21,418	25·1	...	7·7	...	·0	·05
,, VII.—North-Western Frontier, Indus Valley and North Western Rajputana.	1901-1910	17,938	28·7	...	5·2	...	·3	·22
	1911	19,447	23·7	...	2·9	...	·1	·05
	1912	18,302	22·7	...	2·7	...	·1	·05
,, VIII.—South Eastern Rajputana, Central India and Gujarat.	1901-1910	12,188	24·8	...	2·2	...	·1	·04
	1911	11,170	17·3	...	1·6	...	...	...
	1912	11,394	19·0	...	1·3	...	1·3	·53
,, IX.—Deccan	1901-1910	16,648	20·3	...	3·5	·02	·8	·50
	1911	16,656	18·7	...	·3	...	·4	·30
	1912	18,039	19·7	...	1·5	...	2·5	1·00
,, X.—Western Coast	1901-1910	1,850	30·5	...	1·0	...	·1	·05
	1911	1,987	39·8	...	2·0	...	...	...
	1912	1,999	23·5	...	3·5	...	·5	·50
,, XI.—Southern India	1901-1910	5,623	24·5	...	·9	...	·9	·59
	1911	4,898	18·6	...	...	...	·6	·41
	1912	4,683	16·7	...	6·4	...	·2	...
,, XII.—Hill Stations	1901-1910	22,111	27·6	...	6·2	·03	·4	·24
	1911	22,477	22·7	...	7·5	...	·1	·09
	1912	22,019	21·3	...	2·7	...	...	...
Army of India	1901-1910	126,331	23·8	·87	3·9	·01	·5	·30
	1911	131,213	19·8	4·43	3·0	...	·1	·11
	1912	132,232	20·1	...	3·4	...	·6	·29

Sickness and mortality by Geographical Groups.

MILLE OF STRENGTH.

FROM

FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·2	...	·1	...	164·1	·76	66·4	·15	2·3	·68	56·2	·23	29·2	·08	677·3	5·14
...	...	...	...	79·4	...	110·2	...	3·1	1·54	26·2	...	33·9	...	741·9	5·39
...	...	...	...	146·0	...	17·7	...	3·4	...	7·6	...	36·3	...	661·6	4·38
·1	...	·4	·06	303·7	1·71	24·2	·09	2·8	·58	28·1	·21	18·0	...	735·1	5·94
·8	...	·4	...	228·6	1·17	153·8	·39	3·5	·78	12·1	·39	10·5	...	742·6	7·40
·7	...	...	...	223·6	·70	51·2	...	2·5	·35	5·3	...	14·0	...	632·9	1·40
·1	...	1·9	·47	348·9	1·50	3·0	...	7·4	·94	50·7	·75	28·2	...	834·6	6·18
...	...	...	...	110·9	...	14·7	...	12·4	1·13	9·0	...	17·0	...	485·3	2·26
...	...	1·1	...	184·4	...	43·9	...	9·6	1·07	30·0	...	20·4	...	716·0	8·57
·3	...	·4	·18	307·1	1·38	22·7	·13	7·0	1·33	62·2	·44	26·9	·09	752·7	6·27
...	...	1·3	...	114·1	·87	88·4	...	5·7	...	27·9	·44	20·5	·44	586·7	3·48
...	...	1·3	·43	176·7	...	160·4	·43	9·0	·86	19·3	1·29	15·9	...	817·3	5·15
·5	·02	·5	·22	151·8	·99	11·4	·09	8·3	1·64	36·7	·28	17·7	·09	536·5	7·01
...	...	·3	...	55·7	·50	52·4	...	5·5	·33	34·3	·33	19·4	...	513·1	3·48
·6	...	2·0	·47	22·5	·16	40·8	·16	4·0	·62	10·1	...	13·4	·16	446·4	4·04
·6	·03	1·8	·49	212·4	1·01	14·5	·08	13·8	2·51	27·4	·13	18·2	·04	591·5	7·64
·3	...	2·8	·64	69·6	·46	24·3	...	8·5	·87	19·4	·09	14·4	·05	476·0	5·92
·6	·05	1·5	·33	72·8	·09	55·6	·19	7·2	1·03	13·2	...	17·9	·05	638·2	4·34
·6	·03	1·6	·28	387·4	1·06	8·3	·04	18·6	3·61	47·1	·18	13·2	·02	900·8	8·40
·4	...	3·0	·67	166·7	·57	19·9	·05	12·3	2·42	31·7	·05	6·3	...	714·1	5·55
·6	...	2·4	·75	134·5	·16	37·3	·11	7·5	·48	16·2	·05	8·5	·05	705·4	3·16
·7	·01	1·1	·33	301·8	1·14	7·5	·05	13·3	2·41	23·9	·14	26·1	·04	718·0	7·38
·2	...	4·7	·63	85·0	·18	9·8	...	5·8	·90	18·9	...	13·0	·09	436·0	3·13
·1	·09	2·3	·44	65·4	...	42·2	...	7·9	1·05	23·4	...	12·3	·09	478·3	4·21
·8	·03	1·3	·22	127·7	·53	21·7	·05	7·1	1·15	28·3	·15	30·1	·05	518·2	6·04
·4	...	2·4	·36	59·3	·06	34·9	·30	4·9	·42	21·1	·12	21·1	·06	449·7	3·00
·4	...	2·8	1·00	56·1	·48	42·5	·11	6·3	·72	15·4	·05	19·7	·05	479·8	5·99
1·9	·05	6·	·54	238·0	1·24	8·4	·05	9·3	2·38	56·3	·59	43·5	·16	762·3	11·52
5·	...	3·0	·50	315·6	·50	59·9	·50	11·6	4·53	56·9	·50	22·1	...	983·9	11·07
...	·50	...	...	126·1	·50	25·0	...	10·0	2·00	10·19	1·00	16·0	...	610·8	8·00
7·	·07	4·	·05	146·4	·09	23·2	·05	8·7	1·64	26·7	·34	34·4	·07	579·0	8·89
8·	...	8·	...	172·7	·20	21·8	...	6·7	·20	14·1	·20	20·6	...	501·6	3·88
...	...	2·	...	143·3	...	10·9	·21	2·6	·21	8·8	·21	19·4	...	486·7	3·63
3·	·05	2·0	·50	241·1	1·28	18·9	·05	15·5	3·03	34·8	·26	21·1	·06	686·8	10·49
2·	...	2·9	·62	110·0	·69	31·0	·13	8·5	·71	16·8	·09	16·3	...	520·6	4·89
3·	...	2·9	·59	89·5	·45	45·1	·14	8·5	1·54	9·9	·09	9·3	...	548·3	5·63
5·	·03	1·3	·29	238·6	1·02	14·9	·05	12·2	2·26	35·7	·24	21·0	·04	655·3	7·88
3·	...	2·3	·42	105·0	·42	31·0	·08	7·5	·98	22·9	·12	14·9	·03	515·8	4·48
5·	·02	1·8	·47	88·9	·26	44·1	·11	9·9	·83	16·7	·10	14·4	·05	547·5	4·42

TABLE NO. VII.—*Ratios of Armies, 1912.*

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.*
I.—AVERAGE ANNUAL STRENGTH	62,026	51,547	132,232
II.—CONSTANTLY SICK	23·3	19·5	20·1
III.—ADMISSION RATE OF THE YEAR—			
Influenza	3·9	2·6	3·4
Cholera	·3	1·2	·6
Small-pox	·7	·4	·5
Enteric Fever	2·3	1·7	1·8
Malaria	98·1	82·7	88·9
Sandfly Fever	19·5	1·5	10·0
Pyrexia of uncertain origin	50·2	42·0	44·1
Plague	·0	·5	·2
Tubercle of the lungs	2·6	1·5	2·0
Pneumonia	7·9	5·8	6·6
Respiratory Diseases	24·7	25·2	26·2
Dysentery	13·5	18·9	16·7
Diarrhœa	11·4	17·5	13·8
Hepatic { Abscess	·1	·2	·1
Hepatic { Congestion and Inflammation	1·3	1·2	1·3
Scurvy	·4	2·3	1·1
Venereal Diseases	13·4	14·9	14·4
ALL CAUSES	633·8	505·8	547·5
IV.—DEATH RATE OF THE YEAR—			
Cholera	·18	·48	·29
Small-pox	·02	·04	·02
Enteric Fever	·58	·48	·47
Malaria	·23	·27	·26
Sandfly Fever	...	...	...
Pyrexia of uncertain origin	·16	·08	·11
Plague	·02	·33	·14
Circulatory Diseases	·13	·29	·21
Tubercle of the lungs	·34	·16	·24
Pneumonia	1·02	·80	·83
Respiratory Diseases	·21	·12	·17
Dysentery	·10	·10	·10
Diarrhœa	·03	·02	·02
Hepatic Abscess	·03	·08	·05
Anæmia and Debility	...	·16	·08
ALL CAUSES	4·48	4·81	4·42

TABLE NO. VIII.—*Ratios of Geographical Groups, 1912.*

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India.*
I.—AVERAGE ANNUAL STRENGTH	1,185	2,849	933	2,332	6,441	21,418	18,302	11,394	18,039	1,999	4,683	22,019	132,232
II.—CONSTANTLY SICK	29·5	22·5	23·6	25·3	16·9	25·1	22·7	19·0	19·7	23·5	16·7	21·3	20·1
III.—ADMISSION RATE OF THE YEAR—													
Influenza	·8	4·2	...	·9	·5	7·7	2·7	1·3	1·5	3·5	6·4	2·7	3·4
Cholera...	...	...	...	·4	2·8	·0	·1	1·3	2·5	·5	·2	...	·6
Small-pox	...	·7	...	...	·6	·6	·9	1·0	·4	...	...	·3	·6
Enteric Fever	...	...	1·1	1·3	2·0	1·5	2·4	2·3	2·8	...	·2	2·9	1·8
Malaria	146·0	223·6	184·4	176·7	22·5	72·8	134·5	65·4	56·1	126·1	143·3	89·5	88·9
Sandfly Fever	...	...	...	...	...	47·5	10·4	2·0	3·0	...	...	·2	9·8
Pyrexia of uncertain origin ...	17·7	51·2	43·9	160·4	40·8	55·6	37·3	42·2	42·5	25·0	10·9	45·1	44·1
Plague	...	...	...	...	...	·0	...	·2	1·2	·5	·4	...	·4
Tubercle of the lungs ...	·8	·7	1·1	1·3	1·1	3·5	2·0	1·9	·9	2·0	1·7	2·7	2·0
Pneumonia	3·4	2·5	9·6	9·0	4·0	7·2	7·5	7·9	6·3	10·0	2·6	8·5	6·6
Respiratory Diseases ...	42·2	31·6	28·9	30·4	20·5	23·9	24·5	19·4	23·3	21·5	16·4	31·2	26·2
Dysentery	7·6	5·3	30·0	19·3	10·1	13·2	16·2	23·4	15·4	61·0	8·8	6·6	16·7
Diarrhœa	3·4	26·3	17·1	3·4	8·4	11·1	19·3	8·7	14·2	36·0	8·1	16·4	13·8
Hepatic { Abscess ...	...	...	...	·4	...	·3	·1	·4	·1	...	·2	...	·1
Hepatic { Congestion and Inflammation ...	2·5	...	...	1·3	·8	1·9	·5	1·3	1·7	1·0	·9	1·5	1·3
Scurvy	...	...	1·1	1·3	·2	·3	·4	·9	2·2	6·5	·4	1·0	1·1
Venereal Diseases... ...	36·3	14·0	20·4	15·9	13·4	17·9	8·5	12·3	19·7	16·0	19·4	9·3	14·4
ALL CAUSES ...	661·6	632·9	716·0	817·3	446·4	638·2	705·4	478·3	479·8	610·8	486·7	548·3	547·5
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	·43	1·24	·05	·05	·53	1·00	·50	...	...	·29
Small-pox	...	...	...	...	...	·05	...	·09	...	·50	...	...	·02
Enteric Fever	...	...	...	·43	·47	·33	·75	·44	1·00	...	...	·59	·47
Malaria	...	·70	...	...	·16	·09	·16	...	·44	·50	...	·45	·26
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	...	...	...	·43	·16	·19	·11	...	·11	...	·21	·14	·11
Plague	...	...	...	...	...	·05	...	·18	·67	·50	·43	...	·14
Circulatory Diseases ...	·84	...	...	·43	...	·23	·11	·18	·33	...	·43	·18	·21
Tubercle of the lungs ...	...	...	...	·43	·16	·51	·05	·09	·05	...	·21	·54	·24
Pneumonia	...	·35	1·07	·86	·62	1·03	·48	1·05	·72	2·00	·21	1·54	·83
Respiratory Diseases ...	·84	...	...	...	...	·19	·16	·09	·05	...	·21	·36	·17
Dysentery	...	...	...	1·29	...	...	·05	...	·05	1·00	·21	·09	·10
Diarrhœa	...	...	...	...	·16	·05	...	·09	...	...	...	...	·02
Hepatic Abscess	...	...	...	·43	...	...	·05	·18	·05	...	·21	...	·05
Anæmia and Debility ...	...	...	...	...	...	...	...	·35	·11	1·00	..	...	·08
ALL CAUSES ...	4·38	1·40	8·57	5·15	4·04	4·34	3·16	4·21	5·99	8·00	3·63	5·63	4·42

*Including Group Extra India and Field Forces.

TABLE NO. IX—PART I.—*Summary, sickness and mortality—1912.*

Administrations.	Years.	Average strength.‡	Constantly sick.	RATIO PER MILLE OF STRENGTH. * A.—Admissions from D.—Deaths from: Cholera.		Small-pox.		Malaria.		Tubercle of the lungs.		Pneumonia.		Respiratory Diseases.		Dysentery.		Diarrhœa.		Anæmia and debility.		All causes.	
				A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Burma	1902-1911	13,275	17	1·0	·61	·2	·03	59·5	·47	7·3	3·52	3·8	1·05	11·5	·47	27·1	1·88	15·4	·50	3·6	·32	338·7	14·69
	1911	16,282	15	·1	·06	·7	·06	44·0	·37	6·9	3·56	3·3	·48	9·1	·25	15·0	1·41	8·6	·12	4·1	·06	307·3	12·28
	1912	16,339	15	2·3	1·84	·8	·24	30·4	·43	7·7	4·47	3·7	1·10	13·5	·86	20·6	2·39	6·7	·18	3·4	·18	288·9	20·69
Assam	1902-1911	1,475	36	1·7	1·49	·5	·07	316·9	3·66	5·6	2·85	10·3	3·32	21·9	·68	176·3	10·92	79·5	1·32	20·7	3·32	892·6	37·37
	1911	1,766	45	·6	...	...	...	197·6	5·10	8·5	5·66	25·5	7·36	35·1	2·83	233·3	16·42	90·0	2·83	19·8	3·40	1,011·3	58·89
	1912	1,600	39	1·9	·62	·6	...	152·5	1·25	5·0	1·88	13·1	3·13	30·6	3·75	291·9	15·62	69·4	1·25	14·4	·62	900·6	37·50
Bengal	1902-1911	11,615	42	1·0	·70	·5	·06	268·0	1·83	14·2	4·51	11·1	3·23	34·6	·99	212·8	5·79	83·2	·84	15·6	·67	966·3	25·03
	1911	11,852	39	·3	·08	·2	...	251·9	1·43	13·1	4·05	10·7	2·78	34·4	·76	164·0	5·65	107·2	·51	15·4	·76	910·4	30·76
	1912	10,621	44	·4	·28	·9	·28	252·1	1·69	12·5	3·30	7·5	1·79	41·6	1·18	160·9	4·05	115·6	1·41	17·0	·58	973·3	21·84
Bihar and Orissa ...	1902-1911	8,302	34	2·2	1·18	·9	·10	318·6	1·46	8·8	3·39	8·7	2·14	29·5	·52	155·0	5·63	87·1	1·38	11·8	·75	906·6	23·04
	1911	7,055	32	·6	·43	·1	...	214·3	1·84	5·7	1·98	5·8	1·13	31·9	·71	89·6	2·69	100·4	·85	18·1	1·28	740·6	19·28
	1912	6,320	32	3·2	1·27	...	...	179·3	·82	13·6	3·96	5·2	1·74	31·5	·16	100·9	2·69	125·6	·95	18·0	·79	782·3	17·88
United Provinces of Agra and Oudh ...	1902-1911	25,086	29	·5	·33	·7	·07	207·1	1·04	7·6	2·69	14·0	3·32	23·2	·92	39·6	2·86	24·4	1·15	10·0	·22	600·3	17·96
	1911	23,932	24	·2	·13	·1	...	94·0	·96	7·4	2·80	11·4	2·05	22·2	·75	32·1	2·13	19·4	1·17	5·1	·17	442·6	14·62
	1912	22,327	23	...	...	·6	...	74·2	·40	7·4	2·02	9·7	1·61	17·6	·63	24·6	1·88	15·3	·40	7·8	·13	425·7	10·48
Punjab	1902-1911	11,832	29	·2	·08	·6	·07	258·3	·60	12·2	4·83	19·0	4·49	38·5	·79	43·0	2·44	49·1	1·09	21·6	·70	757·2	22·66
	1911	11,910	33	...	...	·3	...	98·2	·76	24·9	7·22	20·2	4·62	55·8	·84	39·5	2·02	42·1	1·26	16·1	1·01	631·0	27·04
	1912	12,010	29	·1	...	1·7	·42	137·3	·17	17·5	5·16	16·5	3·33	37·0	·33	39·0	2·58	41·1	·83	24·1	·17	604·5	19·15
North-West Frontier Province ...	1902-1911	1,340	31	·1	...	·4	·07	459·9	·75	5·5	1·49	19·7	4·18	32·3	·90	69·7	2·61	40·0	·82	13·9	·37	1,046·7	19·25
	1911	1,504	21	...	...	·6	...	197·6	...	2·5	...	16·9	3·14	25·7	...	33·0	...	16·3	·63	6·3	...	670·0	31·29
	1912	1,622	22	...	...	...	...	337·9	·62	8·7	·62	11·7	·62	8·0	1·23	41·3	1·85	33·3	1·23	5·5	...	828·6	11·71
Central Provinces	1902-1911	3,872	22	·2	·08	·4	·05	203·2	·80	6·9	3·07	7·6	1·63	20·4	1·16	54·5	5·32	36·6	·75	12·9	·59	642·7	21·05
	1911	3,576	22	...	...	1·1	...	65·7	·84	13·4	6·15	7·8	2·80	33·4	2·12	95·9	11·47	18·5	·28	12·0	·84	524·0	31·32
	1912	3,130	14	·3	...	·3	...	49·5	·32	8·0	3·51	5·4	1·28	10·9	2·24	60·7	3·83	35·8	1·92	5·1	...	406·4	19·81
Bombay	1902-1911	8,100	28	·6	·26	·8	·05	139·1	1·11	5·4	2·52	16·6	4·52	33·8	1·26	43·9	1·49	38·1	1·25	11·0	·68	591·7	20·49
	1911	8,598	22	...	...	1·4	...	86·8	·70	3·7	1·98	12·6	4·46	39·3	1·51	31·1	1·40	34·1	1·05	9·0	·58	429·5	18·73
	1912	9,053	22	4·4	1·88	1·3	...	67·0	·33	5·5	1·99	7·0	2·32	24·0	·77	41·0	1·99	40·8	1·56	8·8	·55	483·4	17·23
Madras	1902-1911	10,136	21	4·9	2·26	·4	·03	80·4	·89	10·1	3·12	7·4	1·73	23·6	·40	55·4	3·52	6·8	·12	9·3	·50	440·7	19·58
	1911	10,050	21	·4	·20	·4	·10	64·2	·60	13·1	3·18	4·4	·70	26·2	·60	33·5	1·69	10·9	·30	6·3	·30	415·6	13·83
	1912	9,056	20	2·5	1·33	...	...	49·1	·22	8·8	2·32	2·9	·33	21·9	·66	34·8	1·10	19·2	·55	3·4	...	428·2	11·37
INDIA†	1902-1911	95,672	28	1·2	·65	·6	·06	195·6	1·06	9·0	3·36	11·7	2·90	26·0	·80	74·5	3·44	39·6	·90	11·9	·52	649·6	20·15
	1911	97,215	26	·2	·10	·4	·03	113·8	·96	10·5	3·65	10·2	2·37	28·3	·76	56·6	2·91	38·6	·78	10·8	·53	537·7	18·44
	1912	92,626	25	1·4	·77	·8	·13	105·2	·52	9·6	3·18	8·0	1·72	24·0	·79	55·4	2·59	41·2	·79	10·6	·27	535·6	16·74
ANDAMANS	1902-1911	13,488	73	·0	·01	...	...	1,111·9	3·51	10·8	7·01	13·7	4·85	63·8	1·14	127·9	7·46	47·2	·93	·1	...	1,755·0	33·22
	1911	11,884	62	...	...	...	...	680·4	2·02	5·8	5·22	15·0	4·71	67·8	·59	93·8	3·70	50·5	·84	·2	...	1,349·8	24·40
	1912	11,280	75	...	...	...	...	998·7	2·57	8·1	5·23	17·8	6·21	74·2	1·60	99·1	6·03	45·9	·44	·4	·09	1,624·2	31·65
INDIA§	1902-1911	109,160	34	1·1	·57	·5	·05	308·8	1·36	9·3	3·81	11·9	3·14	30·7	·84	81·1	3·94	40·5	·90	10·4	·46	786·2	21·76
	1911	109,099	30	·2	·09	·4	·03	175·5	1·07	9·9	3·82	10·7	2·62	32·6	·74	60·7	3·00	39·9	·79	9·6	·48	615·2	19·09
	1912	103,906	30	1·3	·68	·7	·12	201·6	·74	9·5	3·41	9·1	2·20	29·4	·88	60·2	2·96	41·7	·75	9·5	·25	653·8	18·36

* Excluding subsidiary jails.
† Including Ajmer, Sibi, Quetta, Mercara and Secunderabad, and excluding Andamans.
‡ The decennial ratios are worked on the total strength of the ten year period.
§ Including Andamans.

TABLE NO. IX.—*Part II.—Summary, sickness and mortality—1912.*

	Years.	Average strength.‡	Constantly sick.	RATIO PER MILLE OF STRENGTH.* A.—Admissions from D.—Deaths from: Influenza.		Cholera.		Small-pox.		Enteric Fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhœa.		All causes.	
				A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Group I.—Burma Coast and Bay Islands.	1902-1911	13,206	30	3·3	·02	·4	·19	·2	·03	·6	·18	382·2	1·51	16·1	...	5·6	1·79	59·8	3·97	37·5	·74	797·9	20·18
	1911	11,314	15	·5	·1	...	·09	1·1	·44	2·3	·27	55·9	·27	38·6	...	3·3	·44	14·8	1·59	10·7	·18	342·0	13·08
	1912	11,153	16	...	...	·6	·45	·4	·18	1·5	·18	32·5	·09	36·2	·09	3·0	1·08	22·2	2·96	7·3	·27	317·3	20·62
„ II.—Burma Inland ...	1902-1911	40,61	18	2·0	...	2·1	1·38	·1	...	1·1	·32	59·3	·59	11·1	·02	5·3	1·60	43·6	2·78	23·0	1·01	344·2	17·24
	1911	4,988	14	...	...	·2	·20	...	...	2·6	·20	16·7	·60	22·1	·20	3·2	1·21	15·7	1·01	3·8	...	228·5	10·47
	1912	5,186	13	·2	...	6·0	4·82	1·7	·39	·4	·19	25·6	1·16	9·8	...	5·8	1·16	17·0	1·16	5·6	...	227·7	20·83
„ III.—Assam	1902-1911	1,412	37	14·0	...	1·8	1·56	·6	·07	·9	·28	318·9	3·61	1·6	...	10·3	3·26	175·6	10·63	79·7	1·20	894·2	36·84
	1911	1,676	47	...	...	·6	...	...	...	·6	...	190·3	4·77	1·8	...	26·8	7·76	337·5	17·30	90·1	2·98	1,008·9	61·46
	1912	1,516	40	...	...	2·0	·66	...	·7	...	...	149·1	1·32	25·1	...	13·2	3·30	294·9	15·83	69·9	1·32	903·7	38·92
„ IV.—Bengal and Orissa ...	1902-1911	12,571	41	11·7	·32	1·5	·90	·5	·06	1·0	·29	295·9	1·81	3·7	·02	10·8	3·13	207·2	5·97	81·5	·95	946·9	25·11
	1911	12,673	38	·6	·08	·4	·16	·2	...	·4	·24	253·4	1·34	1·5	·08	10·1	2·60	162·3	5·44	105·3	·47	905·6	20·11
	1912	11,396	43	2·1	·09	1·8	·79	·9	·26	1·5	·44	243·6	1·58	10·4	·09	7·4	1·76	157·2	3·86	112·0	1·40	952·4	22·20
„ V.—Gangetic Plain and Chutia Nagpur.	1902-1911	23,264	29	4·0	·04	·9	·55	·9	·07	·5	·12	214·6	1·23	6·3	·02	10·2	2·28	76·1	3·71	43·0	1·15	658·6	19·12
	1911	21,203	26	1·3	...	·3	·24	·1	...	·8	·24	113·5	1·37	4·4	·05	7·8	1·27	49·4	2·55	44·0	1·46	498·6	16·60
	1912	19,490	26	·4	...	·2	·10	·1	...	·6	·05	101·8	·41	7·4	...	6·2	1·54	45·3	2·26	49·3	·62	525·6	12·26
„ VI.—Upper Sub-Himalaya ...	1902-1911	12,632	29	7·4	·14	·1	·01	·6	·10	·6	·18	306·9	·79	4·6	·02	19·9	4·94	44·5	2·61	39·7	1·33	771·1	20·70
	1911	12,745	27	1·0	...	·1	...	·2	...	·2	·16	119·3	·94	6·8	·08	18·9	4·63	27·0	1·65	34·5	1·10	555·8	37·42
	1912	12,570	28	4·5	...	·1	...	1·4	·32	·5	·08	135·2	·24	15·0	·08	16·9	2·47	29·7	2·31	35·0	·80	565·2	15·43
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1902-1911	8,308	29	5·9	·12	·2	·06	·9	·08	·4	·12	220·9	·99	2·4	·04	23·9	6·04	45·9	2·53	40·0	·76	687·1	23·65
	1911	9,101	30	·4	...	...	...	·9	·11	·3	·11	100·1	·33	3·7	·11	20·7	5·38	42·7	1·65	23·4	·55	592·2	23·39
	1912	9,219	22	·1	·11	...	...	1·2	·11	·3	...	128·3	·33	6·6	·11	13·5	3·04	35·5	1·63	20·3	·54	542·6	16·49
„ VIII.—South-Western Rajputana, Central India and Gujarat.	1902-1911	4,460	33	1·9	·02	·3	·25	·5	·02	·2	·07	195·1	·63	·7	·02	18·2	4·06	26·5	1·66	29·8	·81	620·2	18·14
	1911	4,197	23	4·1	...	...	...	1·4	...	...	...	83·9	·95	·2	...	12·2	3·38	14·5	1·43	20·5	·48	443·7	12·87
	1912	3,979	28	...	...	4·0	1·76	3·3	...	·3	...	76·7	·75	2·8	...	6·0	1·26	20·9	2·01	23·1	·75	415·4	14·58
„ IX.—Deccan ...	1902-1911	7,475	28	8·0	·05	·3	·19	·3	·04	·4	·12	187·8	·82	5·8	...	6·5	1·43	53·1	3·26	40·4	·82	690·2	17·00
	1911	7,236	24	2·1	...	...	...	·6	...	·7	·14	98·1	·83	11·9	...	6·8	2·07	70·1	6·08	29·9	·55	546·4	22·39
	1912	7,014	19	4·0	...	3·3	1·43	·4	...	·6	·14	54·6	·29	34·6	...	6·6	1·71	56·2	2·71	48·5	1·14	510·4	16·11
„ X.—Western Coast ...	1902-11	2,465	23	·0	...	1·5	·61	·8	·08	5·6	1·14	113·6	1·22	10·4	·08	8·6	2·23	53·0	2·60	38·0	1·62	503·1	24·26
	1911	2,329	22	...	...	...	...	1·3	·42	2·6	·43	49·8	...	4·3	...	8·2	2·58	34·8	2·58	48·9	1·72	416·5	20·61
	1912	2,208	20	...	...	·9	...	·5	...	2·3	...	68·8	...	5·4	...	6·8	1·81	53·0	1·81	32·2	3·62	446·6	14·95
„ XI.—Southern India ...	1902-1911	9,164	21	·5	·01	5·0	2·17	·3	·02	1·1	·22	80·9	·73	21·1	...	7·3	1·80	54·5	3·37	5·5	·12	439·4	18·82
	1911	9,170	21	...	...	·4	·22	·2	...	·9	·22	66·1	·65	14·9	...	4·1	·55	35·9	1·74	10·6	·33	413·0	13·85
	1912	8,310	20	·7	...	2·8	1·44	...	...	1·4	...	48·6	·24	54·5	...	3·0	·36	37·4	1·20	20·9	·60	429·8	12·03
„ XII.—Hills	1902-1911	586	27	...	...	6·8	5·12	·9	...	2·6	1·36	253·4	3·07	11·8	...	21·3	5·63	87·6	7·84	57·1	1·71	867·5	36·49
	1911	540	24	...	...	...	...	...	...	...	...	172·2	3·70	7·4	...	18·5	3·70	27·8	...	61·1	...	874·1	12·96
	1912	564	28	...	...	...	...	...	...	5·6	...	250·9	...	7·5	...	22·5	5·62	125·5	7·49	106·7	1·87	985·0	22·47
INDIA †	1902-1911	95,672	28	5·3	·08	1·2	·65	·6	·06	·8	·22	195·6	1·06	8·4	·02	11·7	2·90	74·5	3·44	39·6	·90	649·6	20·15
	1911	97,215	26	·9	·01	·2	·10	·4	·03	·9	·22	113·8	·96	11·0	·05	10·2	2·37	56·6	2·91	38·6	·78	537·7	18·44
	1912	92,626	25	1·3	·02	1·4	·77	·8	·13	·9	·12	105·2	·52	18·6	·04	8·0	1·72	55·4	2·59	41·2	·79	535·6	16·74
ANDAMANS	1902-1911	13,488	73	6·0	·01	·0	·01	...	...	·1	·03	1,111·9	3·51	9·3	·01	13·7	4·86	127·9	7·46	47·2	·93	1,755·0	33·22
	1911	11,884	62	...	...	...	...	...	...	·2	·17	680·4	2·02	·1	...	15·0	4·71	93·8	3·70	50·5	·84	1,249·8	24·49
	1912	11,280	75	...	...	...	...	...	...	...	...	993·7	2·57	6·1	·44	17·8	6·21	99·1	6·03	45·9	·44	1,624·2	31·65
INDIA§	1902-1911	109,160	34	5·4	·07	1·1	·57	·5	·05	·7	·19	308·8	1·36	8·5	·02	11·9	3·14	81·1	3·94	40·5	·90	786·2	21·76
	1911	109,093	30	·8	·01	·2	·09	·4	·03	·8	·21	175·5	1·07	9·5	·05	10·7	2·62	60·7	3·00	39·9	·79	615	19·09
	1912	103,906	30	1·2	·02	1·3	·68	·7	·12	·8	·11	201·6	·74	17·3	·09	9·1	2·20	60·2	2·96	41·7	·75	653·8	18·36

*Excluding subsidiary jails.
† Including Aden and excluding Andamans.
‡ The decennial ratios are worked on the total strength of the ten year period.
Including Andamans.

PRISONERS.

TABLE NO. X.—*Ratios of Administrations, 1912.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	Burma.	Assam.	Bengal.	Bihar and Orissa.	United Provinces.	Punjab.	N.-W.F. Province.	Central Provinces.	Bombay.	Madras.	India. *	Andamans.	India. †
I.—AVERAGE ANNUAL STRENGTH ...	16,339	1,600	10,621	6,320	22,327	12,010	1,622	3,130	9,054	9,056	92,626	11,280	103,906
II.—CONSTANTLY SICK RATE OF THE YEAR	15·1	39·4	43·7	31·6	23·4	28·6	22·2	14·1	21·5	19·9	25·0	75·4	30·5
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	36·6	41·9	30·3	...	27·9	21·1	14·0	20·1	19·1	24·3	...	29·5
III.—ADMISSION RATE OF THE YEAR—													
Influenza	·1	...	2·3	...	2·9	...	...	8·9	·1	·7	1·3	...	1·2
Cholera	2·3	1·9	·4	3·2	...	·1	...	·3	4·4	2·5	1·4	...	1·3
Small-pox	·8	·6	·9	...	·6	1·7	...	·3	1·3	...	·8	...	·7
Enteric Fever	1·2	...	1·6	·8	·5	·2	1·8	·6	·9	1·3	·9	...	·8
Malaria	30·4	152·5	252·1	179·3	74·2	137·3	337·9	49·5	67·0	49·1	105·2	993·7	201·6
Pyrexia of uncertain origin ...	27·8	23·8	9·6	4·6	6·9	15·3	27·7	11·8	23·2	50·9	18·6	6·1	17·3
Tubercle of the lungs	7·7	5·0	12·5	13·6	7·4	17·5	3·7	8·0	5·5	8·8	9·6	8·1	9·5
Pneumonia	3·7	13·1	7·5	5·2	9·7	16·3	11·7	5·4	7·0	2·9	8·0	17·8	9·1
Respiratory Diseases	13·5	30·6	41·6	31·5	17·6	37·0	8·0	10·9	24·0	21·9	24·0	74·2	29·4
Dysentery	20·6	291·9	160·9	100·9	24·6	39·0	41·3	60·7	41·0	34·8	55·4	99·1	60·2
Diarrhœa	6·7	69·4	115·6	125·6	15·3	41·1	33·3	35·8	40·8	19·2	41·2	45·9	41·7
Spleen Diseases	·1	...	·1	·3	·2	·9	·6	·3	·3	...	·3	...	·2
Scurvy	5·2	26·2	·6	·2	·0	...	1·8	...	5·7	...	2·1	2·4	2·1
Anæmia and Debility	3·4	14·4	17·0	18·0	7·8	24·1	5·5	5·1	8·8	3·4	10·6	·4	9·5
Abscess, Ulcer, and Boil ...	28·6	33·8	62·5	63·8	81·7	95·2	121·5	42·8	50·9	28·9	61·3	56·6	60·8
ALL CAUSES ...	288·9	900·6	973·3	782·3	425·7	604·5	828·6	406·4	483·4	428·2	535·6	1,624·2	653·8
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	866·6	964·3	773·1	...	603·2	831·5	406·0	516·6	498·7	547·5	...	657·7
IV.—DEATH RATE OF THE YEAR—													
Cholera	1·84	·62	·28	1·27	...	...	...	...	1·88	1·33	·77	...	·68
Small-pox	·24	...	·28	...	...	·42	...	...	...	...	·13	...	·12
Enteric Fever	·18	...	·47	...	·09	...	...	...	·11	...	·12	...	·11
Malaria	·43	1·25	1·69	·32	·40	·17	·62	·32	·33	·22	·52	2·57	·74
Pyrexia of uncertain origin ...	·06	...	·09	...	...	·17	...	...	...	...	·04	·44	·09
Tubercle of the lungs	4·47	1·88	3·30	3·96	2·02	5·16	·62	3·51	1·99	2·32	3·18	5·23	3·41
Pneumonia...	1·10	3·13	1·79	1·74	1·61	3·33	·62	1·28	2·32	·33	1·72	6·21	2·20
Respiratory Diseases	·86	3·75	1·13	·16	·63	·33	1·23	2·24	·77	·66	·79	1·60	·88
Dysentery	2·39	15·62	4·05	2·69	1·88	2·58	1·85	3·83	1·99	1·10	2·59	6·03	2·96
Diarrhœa	·18	1·25	1·41	·95	·40	·83	1·23	1·92	1·55	·55	·79	·44	·75
Hepatic Abscess	·18	...	·09	·16	...	·08	...	...	...	...	·06	·18	·08
Anæmia and Debility	·18	·62	·56	·79	·13	·17	...	...	·55	...	·27	·69	·25
Phagedæna, Slough, and Gangrene	·12	...	...	·16	...	·08	...	...	...	·11	·05	·09	·06
ALL CAUSES ...	20·69	37·50	21·84	17·88	10·48	19·15	11·71	19·81	17·23	11·37	16·74	31·65	18·36
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	36·09	21·79	17·54	...	18·87	11·12	19·79	15·96	11·56	16·60	...	18·14

* Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and excluding Andamans.
† Including Ajmer, Sibi, Quetta, Secunderabad, Mercara and Andamans.

PRISONERS.

TABLE NO. XI.—*Ratios of Geographical Groups, 1912.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH ...	11,153	5,186	1,516	11,396	19,490	12,570	9,219	3,979	7,014	2,208	8,310	534	92,626
II.—CONSTANTLY SICK RATE OF THE YEAR.	16·0	13·3	40·2	42·7	26·4	28·2	21·5	23·1	18·8	20·4	20·1	28·1	25·0
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	·2	...	2·1	·4	4·5	·1	...	4·0	...	·7	...	1·3
Cholera	·6	6·0	2·0	1·8	·2	·1	...	4·0	3·3	·9	2·8	...	1·4
Small-pox	·4	1·7	·7	·9	·1	1·4	1·2	3·3	·4	·5	...	...	·8
Enteric Fever	1·5	·4	...	1·5	·6	·5	·3	·3	·6	2·3	1·4	5·6	·9
Malaria	32·5	25·6	149·1	243·6	101·8	135·2	128·3	76·7	54·6	68·8	48·6	250·9	105·2
Pyrexia of uncertain origin ...	36·2	9·8	25·1	10·4	7·4	15·0	6·6	2·3	34·6	5·4	54·5	7·5	18·6
Tubercle of the lungs ...	7·2	8·9	5·3	12·6	7·6	16·4	11·1	4·3	6·8	11·3	7·8	3·7	9·6
Pneumonia	3·0	5·8	13·2	7·4	6·2	16·9	13·5	6·0	6·6	6·8	3·0	22·5	8·0
Respiratory Diseases ...	15·7	8·9	29·7	39·8	21·7	22·4	36·0	18·3	15·5	30·3	21·7	67·4	24·0
Dysentery	22·2	17·0	294·9	157·2	45·3	29·7	35·5	20·9	56·2	53·0	37·4	125 5	55·4
Diarrhœa	7·3	5·6	69·9	112·0	49·3	35·0	20·3	23·1	48·5	32·2	20·9	106·7	41·2
Spleen Diseases	·2	...	...	·1	·2	·9	·8	...	·1	...	...	...	·3
Scurvy	7·5	·2	27·7	·6	...	...	5·9	·3	·3	...	...	...	2·1
Anæmia and Debility ...	4·3	1·3	13·9	18·6	8·3	18·0	16·5	15·8	5·1	11·3	3·0	11·2	10·6
Abscess, Ulcer, and Boil ...	33·5	18·1	31·0	62·2	81·4	87·7	85·2	59·6	55·0	44·4	25·9	80·5	61·3
ALL CAUSES ...	317·3	227·7	903·7	952·4	525 6	565·2	542·6	415·4	510·4	446·6	429·8	985·0	535·6
IV.—DEATH RATE OF THE YEAR—													
Cholera	·45	4·82	·66	·79	·10	...	...	1·76	1·43	...	1·44	...	·77
Small-pox	·18	·39	...	·26	...	·32	·11	...	...	...	...	...	·13
Enteric Fever	·18	·19	...	·44	·05	·08	...	...	·14	...	...	...	·12
Malaria	·09	1·16	1·32	1·58	·41	·24	·33	·75	·29	...	·24	...	·52
Pyrexia of uncertain origin ...	·09	...	...	·09	...	·08	·11	...	...	...	...	...	·04
Tubercle of the lungs ...	4·39	4·63	1·98	3·25	2·72	3·90	3·47	2·01	2·28	1·81	2·41	...	3·18
Pneumonia	1·08	1·16	3·30	1·76	1·54	2·47	3·04	1·26	1·71	1·81	·36	5·62	1·72
Respiratory Diseases... ...	·72	1·16	3·96	1·05	·36	·56	·65	1·26	1·28	·45	·72	...	·79
Dysentery	2·96	1·16	15·83	3·86	2·26	2·31	1 63	2·01	2·71	1·81	1·20	7·49	2·59
Diarrhœa	·27	...	1·32	1·40	·62	·80	·54	·75	1·14	3·62	·60	1·87	·79
Hepatic Abscess	·27	...	...	·09	·05	·08	...	...	...	...	...	...	·06
Anæmia and Debility ...	·27	...	·66	·70	·31	·16	·11	·25	·29	·45	...	...	·27
Phagedæna, Slough, and Gangrene.	·09	·19	...	...	·05	·08	...	...	...	...	·12	...	·05
ALL CAUSES ...	20·62	20·83	38·92	22·20	12·26	15·43	16·49	14·58	16·11	14·95	12·03	22·47	16·74

* Including Aden.

Table XII—Provincial Birth and Death Statistics, 1912.

Province.	Year.	Births.			Number of Deaths.			Ratio of deaths per 1,000 of population.			Highest Death-rate.		Lowest Death-rate.		Mean death rate during previous five years.			Number of deaths of males to every 100 deaths of females.
		Total number.	Ratio per 1,000 of population	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Delhi	1911 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	1912 ...	18,105	46·03	38·05	10,023	5,420	15,443	43·74	33·01	39·26	...	...	...	...	55·34	55·27	55·29	103·49
Bengal	1911 ...	1,585,187	34·97	...	...	...	1,221,580	23·13	27·21	26·94	...	...	...	...	...	...	...	...
	1912 ...	1,600,335	35·30	34·83	71,148	1,278,631	1,349,779	24·47	30·14	29·77	50·97	43·74	3·89	20·29	24·73	29·31	29·02	109
Bihar and Orissa	1911 ...	...	42·87	...	...	...	3,512	...	...	...	...	...	...	...	...	...	...	...
	1912 ...	1,458,295	42·52	39·09	35,892	1,027,536	1,063,428	29·97	31·04	31·01	72·43	49·24	4·56	20·02	32·24	35·39	35·28	107
Assam	1911 ...	...	31·98	...	...	...	2,361	...	...	...	...	...	...	...	...	...	...	...
	1912 ...	194,676	32·16	31·90	2,501	149,065	151,566	20·80	25·13	25·04	38·10	38·74	6·84	20·87	22·20	27·16	27·06	110
United Provinces of Agra and Oudh.	1911 ...	2,053,324	43·84	38·63	174,206	1,931,086	2,105,292	56·04	44·16	44·95	185·15	60·46	23·82	24·57	46·41	41·95	42·25	105·77
	1912 ...	2,125,585	45·38	39·36	106,037	1,294,770	1,400,807	34·36	29·56	29·91	81·13	47·58	16·82	20·05	47·82	43·12	43·43	109·84
Punjab	1911 ...	865,775	43·9	41·6	76,902	595,017	671,991	39·74	33·43	34·05	113·49	53·66	3·68	19·10	45·36	43·41	43·61	106·1
	1912 ...	876,125	45·3	41·5	54,473	460,563	515,035	31·94	26·12	26·63	79·24	33·38	6·75	19·02	43·53	42·63	42·71	109·9
North-West Frontier Province...	1911 ...	71,606	35·1	34·2	4,782	42,776	47,558	25·60	23·12	23·30	34·25	25·76	6·54	21·79	29·90	29·95	30·35	115·4
	1912 ...	75,653	37·1	33·7	4,347	43,402	47,749	22·73	23·46	23·39	39·95	27·01	6·22	20·26	28·13	27·98	27·91	113·8
Central Provinces and Berar ...	1911 ...	688,432	49·3	52·68	51,285	431,212	482,497	44·94	33·75	34·67	137·35	52·10	19·27	27·55	42·85	39·83	40·14	111·81
	1912 ...	671,298	48·24	46·38	58,280	531,005	589,285	47·60	41·84	42·34	88·37	68·09	20·33	27·15	41·85	33·29	34·04	109·33
Madras Presidency ...	1911 ...	1,226,488	38·4	32·2	136,267	797,243	933,510	28·2	22·4	23·1	68·5	35·5	1·0	13·8	29·9	24·2	24·9	104·2
	1912 ...	1,245,465	30·9	32·1	138,005	844,303	982,308	28·6	23·8	24·3	66·4	35·3	2·5	15·3	28·9	23·3	24·0	104·2
Coorg	1911 ...	4,768	27·25	25·40	488	5,207	5,695	48·89	31·56	32·55	60·08	44·23	42·27	21·06	53·50	32·95	34·12	127·71
	1912 ...	4,606	26·32	26·35	640	6,073	6,713	64·12	36·81	38·37	91·86	51·66	47·69	29·80	53·50	33·39	34·59	111·63
Bombay Presidency ...	1911 ...	705,090	36·00	35·10	100,969	454,343	555,312	36·89	26·96	28·35	125·99	70·54	8·26	11·02	39·99	28·72	30·54	107·47
	1912 ...	684,890	34·97	35·53	113,522	569,688	683,210	41·48	33·80	34·88	76·74	49 92	12·01	12·44	36·62	27·69	29·20	105·82
Lower Burma ...	1911 ...	200,947	31·44	33·96	29,094	124,218	153,312	36·35	22·22	23·99	55·34	28·37	12·50	16·29	41·03	25·36	27·35	124
	1912 ...	202,197	31·68	33·71	29,874	136,079	165,953	37·23	24·38	26·00	64·89	34·97	18·36	18·51	39·69	24·74	26·64	123
Upper Burma	1911 ...	121,509	34·85	...	14,825	79,545	94,370	50·16	24·93	27·07	62·86	36·11	20·54	19·29	42·99	27·51	29·22	101
	1912 ...	114,457	32·96	35·69	16,016	87,520	100,536	44·05	27·54	28·95	55·77	46·93	18·29	22·76	42·91	27·69	29·30	101
Ajmer-Merwara	1911 ...	22,700	47·60	36·61	5,649	15,533	21,182	43·57	44·72	44·41	60·74	57·48	31·74	34·48	51·23	36·60	40·48	110·08
	1912 ...	23,609	47·08	40·35	Not available		19,171	Not available		38·25	Not available		...	...	...	...	43·02	109·27

TABLE NO. XIII.—*Births—1912.*

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Delhi	393,356	...	...	46·03	101·57	6·77	...
Bengal	45,329,247	44·41	21·67	35·30	106	5·53	...
Bihar and Orissa	34,290,633	49·64	31·60	42·52	104	11·51	...
Assam	6,051,507	38·77	27·71	32·16	107	7·12	...
United Provinces of Agra and Oudh.	46,835,108	55·34	26·61	45·38	108·41	15·47	...
Punjab	19,337,146	53·1	20·2	45·3	109·6	18·7	...
North-West Frontier Province ...	2,041,077	42·5	31·5	37·1	123·0	9·2	...
Central Provinces and Berar ...	13,916,308	55·08	45·01	48·24	104·56	5·90	...
Madras Presidency	40,347,357	39·0	18·2	30·9	104·8	6·6	...
Coorg	174,976	37·52	19·36	26·32	107·29	...	12·04
Bombay Presidency	19,587,383	49·03	16·54	34·97	108·18	·09	...
Burma... Lower	6,382,847	43·57	18·25	31·68	108	6	...
Burma... Upper	3,473,006	38·85	26·29	32·96	105	4	...
Ajmer-Merwara	501,395	52·14	45·47	47·08	123·10	8·84	...

TABLE NO. XIV.—*Deaths—1912.*

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of Deaths per 1,000 of population.			Death rate by sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Delhi	393,356	*682	*33,599	...	...	39·26	35·98	43·35
Bengal	45,329,247	70,873	639	43·36	20·06	29·77	30·35	29·17
Bihar and Orissa ...	34,290,633	81,524	420	39·98	19·98	31·01	32·87	29·22
Assam	6,051,507	33,551	180	38·51	20·83	25·04	25·37	24·69
United Provinces of Agra and Oudh.	46,835,108	106,402	440	47·55	20·87	29·91	29·97	29·85
Punjab	19,337,146	96,654	200	33·8	19·8	26·6	25·4	28·1
North-West Frontier Province.	2,041,077	13,399	152	27·2	20·3	23·4	23·5	23·2
Central Provinces and Berar.	13,916,308	99,803	139	66·46	27·29	42·34	44·41	40·30
Madras Presidency ...	40,347,357	129,870	311	39·2	16·4	24·3	25·2	23·5
Coorg	174,976	1,582	111	51·66	31·51	38·37	36·40	40·83
Bombay Presidency ...	19,587,383	122,978	159	49·79	12·64	34·88	34·48	35·32
Burma Lower ...	6,382,847	75,866	84	36·77	19·88	26·00	27·13	24·73
Burma Upper ...	3,473,006	35,792	97	47·18	23·01	28·95	30·23	27·76
Ajmer-Merwara ...	501,395	2,711	176	40·33	37·59	38·25	37·62	38·96

* Delhi City only.

TABLE NO. XV.—*Deaths in Towns and Rural Circles compared—1912.*

Province.	Number of Registration Circles.			Population.			Ratio of deaths per 1,000 of population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Delhi	6	1	7	164,212	229,144	393,356	33·01	43·74	39·26
Bengal	375	112	487	42,421,996	2,907,251	45,329,247	30·14	24·47	29·77
Bihar and Orissa ...	227	55	282	33,093,280	1,197,353	34,290,633	31·04	29·97	31·01
Assam	76	19	95	5,931,275	120,232	6,051,507	25·13	20·80	25·04
United Provinces of Agra and Oudh.	1,076	93	1,169	43,799,642	3,035,466	46,835,108	29·56	34·36	29·91
Punjab	403	129	532	17,631,633	1,705,513	19,337,146	26·12	31·94	26·63
North-West Frontier Province.	52	13	65	1,849,832	191,245	2,041,077	23·46	22·73	23·39
Central Provinces and Berar.	290	104	394	12,691,981	1,224,327	13,916,308	41·84	47·60	42·34
Madras Presidency...	231	269	500	35,516,696	4,830,661	40,347,357	23·8	28·6	24·3
Coorg	8	2	10	164,995	9,981	174,976	36·81	64·12	38·37
Bombay Presidency	228	65	293	16,850,573	2,736,810	19,587,383	33·80	41·48	34·88
Burma { Lower ...	228	41	269	5,580,530	802,317	6,382,847	24·38	37·23	26·00
Burma { Upper ...	122	18	140	3,177,526	295,480	3,473,006	27·54	44·05	28·95
Ajmer-Merwara ...	not available		23	not available		501,395	not available		38·25

TABLE NO. XVI.—*Deaths according to age—1912.*

Province.	Ratio per 1,000 of Population.																			
	Under one year.*		1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Delhi ...	282·14	263·42	Information not available.																	
Bengal ...	220·63	203·45	43·13	37·83	16·02	12·92	10·82	9·86	14·51	16·71	15·54	18·63	18·79	20·23	24·64	22·78	39·62	36·94	75·32	64·47
Bihar and Orissa.	188·34	170·94	51·96	45·50	16·55	14·82	13·52	12·47	13·99	12·85	17·40	15·44	19·52	17·12	25·40	20·13	39·25	33·94	78·85	64·05
Assam ...	205·61	187·11	33·14	29·89	12·36	10·14	10·67	9·62	13·30	16·52	13·19	17·26	16·56	19·28	22·37	22·05	34·81	31·29	54·17	43·44
United Provinces of Agra and Oudh.	213·73	198·74	50·06	48·44	10·77	11·08	9·14	10·49	10·39	13·09	13·72	15·20	16·24	16·26	22·88	20·46	36·66	32·63	63·13	55·60
Punjab ...	195·10	194·57	44·32	45·00	9·36	10·36	7·51	10·38	7·85	10·66	8·84	11·52	10·80	13·34	15·29	14·93	22·73	21·98	60·05	62·86
North-West Frontier Province.	171·80	162·53	45·4	41·5	10·7	10·8	7·9	10·4	9·0	10·3	9·8	10·8	11·2	13·6	15·3	16·8	23·3	23·1	47·9	46·3
Central Provinces and Berar.	312·23	274·13	84·13	71·02	17·76	15·74	11·28	11·97	14·36	15·96	14·59	15·98	17·13	17·09	24·40	20·17	40·56	35·01	92·23	80·66
Madras Presidency.	199·78	180·55	34·6	32·9	10·6	9·8	7·3	7·1	10·2	12·7	11·5	12·4	14·7	13·4	19·5	15·3	30·4	25·3	70·9	69·0
Coorg ...	277·57	283·21	60·46	57·81	16·73	13·97	9·58	13·08	13·93	16·89	19·05	30·95	33·02	32·75	44·59	43·62	59·72	54·35	101·73	108·97
Bombay Presidency.	225·81	211·01	70·81	69·53	16·13	16·67	10·54	12·87	13·34	17·15	14·61	17·71	18·17	18·73	27·27	20·99	42·61	35·79	100·19	96·94
Burma { Lower	236·69	198·37	...	70·72	13·99	12·32	9·40	8·87	13·43	10·83	14·92	...	...	14·70	25·18	...	...	20·93	66·98	67·23
Burma { Upper	262·53	227·92	...	80·31	13·94	11·43	8·51	7·32	11·71	10·04	13·43	...	...	14·73	23·59	...	...	20·30	77·52	72·66
Ajmer-Merwara.	Information not available.																			
Total ...	216·01	198·71	50·87	44·48	13·56	12·49	9·87	10·15	11·98	14·05	13·34	16·00	17·47	15·88	22·01	20·12	36·76	29·46	72·69	66·57

*Calculated on the number of births during 1912.

TABLE XVII.—*Deaths according to cause—1912.*

Province.	Deaths per 1,000 of Population in 1912.								All causes.	Ratio of deaths in 1911.	Ratio of deaths in 1910
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Delhi	1·03	1·31	·25	24·63	·73	8·54	·08	2·69	39·26	...	...
Bengal	2·10	·18	·04	21·16	·60	·22	·37	5·07	29·77	26·94	...
Bihar and Orissa	2·24	·06	1·70	18·80	·75	·18	·48	6·75	31·01	35·12	...
Assam	2·36	·77	...	12·94	2·19	·57	·31	5·89	25·04	23·61	...
United Provinces of Agra and Oudh	·40	·07	2·45	20·66	·32	·40	·50	5·11	29·91	44·95	38·67
Punjab	·09	1·57	1·54	14·22	·51	2·14	·35	6·20	26·63	34·05	33·28
North-West Frontier Province ...	·65	·99	·0005	16·11	·14	·75	·41	4·34	23·39	23·30	26·85
Central Provinces and Berar ...	2·46	·33	1·38	19·41	4·23	3·21	·47	10·85	42·34	34·67	44·88
Madras Presidency	2·3	·4	·2	7·6	1·8	·9	·2	10·9	24·3	23·1	24·7
Coorg	...	·30	·05	32·56	1·32	·43	·11	3·59	38·37	32·55	37·77
Bombay Presidency	3·29	·32	1·48	14·62	2·91	3·61	·37	8·28	34·88	28·35	30·30
Burma { Lower	·94	·96	·40	8·35	1·48	·82	·31	12·74	26·00	23·99	26·99
Burma { Upper	·34	·53	·13	9·41	·65	·73	·41	16·75	28·95	27·07	30·27
Ajmer-Merwara	·03	6·08	·03	27·77	1·10	·79	·43	2·02	38·25	44·41	50·08

TABLE No. XVIII.—*Total number of deaths by months—1912.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1912.	1911.
Delhi ...	1,493	1,177	915	1,135	1,430	1,385	1,102	1,025	1,480	1,363	1,543	1,395	15,443	*39·26*	...
Bengal ...	138,628	94,121	104,410	138,371	97,097	82,040	91,829	79,508	101,266	111,283	132,258	179,068	1,349,779	*29·77*	26·94
Bihar & Orissa	94,962	76,554	92,493	101,236	108,201	99,165	82,847	82,893	87,389	78,088	74,330	85,270	1,063,428	*31·01*	35·12
Assam ...	12,395	9,609	10,080	11,934	14,364	15,191	13,276	11,586	11,899	12,883	13,237	15,112	151,566	*25·04*	23·61
United Provinces of Agra and Oudh.	133,868	125,011	144,793	141,916	131,048	123,768	95,201	88,128	101,608	102,388	93,880	119,198	1,400,807	*29·91*	44·95
Punjab ...	37,223	34,222	43,668	50,167	50,901	43,121	39,236	35,330	40,207	42,639	45,173	53,149	515,036	*26·63*	34·05
North-West Frontier Province.	3,633	3,630	3,607	3,375	3,681	4,027	4,192	4,307	4,151	3,845	4,448	4,853	47,749	*23·39*	23·30
Central Provinces and Berar.	42,821	36,813	42,876	37,841	50,138	43,730	35,789	55,399	82,320	72,951	48,086	40,521	589,285	*42·34*	34·69
Madras Presidency.	105,093	69,745	67,006	61,394	72,997	76,723	83,861	94,266	85,708	80,624	83,467	101,424	982,308	*24·3*	23·1
Coorg ...	470	357	440	433	654	990	804	716	544	442	427	436	6,713	*38·37*	32·55
Bombay Presidency.	53,872	43,738	49,044	50,324	55,976	60,433	72,538	77,561	65,689	57,226	50,898	45,911	983,210	*34·88*	28·35
Burma { Lower	12,401	12,261	11,556	12,984	12,908	14,130	16,999	16,868	15,001	13,015	13,186	14,644	165,953	*26·00*	23·99
Burma { Upper	8,032	6,725	7,491	7,574	7,144	7,555	8,962	9,041	8,211	8,586	9,536	11,679	100,536	*28·95*	27·07
Ajmer-Merwara.	1,683	1,820	2,504	1,772	1,662	1,190	960	1,742	2,068	1,387	1,169	1,221	19,178	*38·25*	44·43
Total ...	646,474	515,783	580,883	620,436	608,201	573,448	547,596	558,370	607,541	586,720	571,638	673,881	7,090,991	*29·71*	32·01

TABLE No. XIX.—*Ratio of deaths from all causes according to months—1912.*

Province.	Annual* death rate per mille for the month of: January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Ratio for the year.
Delhi	44·69	37·66	27·39	35·11	42·80	42·84	32·99	30·68	45·77	40·80	47·73	41·76	39·26
Bengal	35·98	26·13	27·12	37·14	25·22	22·02	23·85	20·65	27·18	28·91	35·50	46·51	29·77
Bihar and Orissa	32·61	28·10	31·76	35·92	37·15	35·18	28·45	28·46	31·01	26·81	26·37	29·28	31·01
Assam	24·12	19·99	19·61	23·99	27·95	30·54	25·83	22·54	23·92	25·07	26·61	29·40	25·04
United Provinces of Agra and Oudh ...	33·65	33·59	36·40	36·87	32·95	32·15	23·93	22·16	26·40	25·74	24·39	29·97	29·91
Punjab	22·66	22·27	26·59	31·56	30·99	27·13	23·89	21·51	25·30	25·96	28·42	32·36	26·63
North-West Frontier Province ...	20·96	22·38	20·81	20·12	21·23	24·00	24·18	24·85	24·74	22·18	26·51	28·00	23·39
Central Provinces and Berar ...	36·23	33·29	36·28	33·08	42·42	38·23	30·28	46·87	71·97	61·72	42·04	34·28	42·34
Madras Presidency	30·67	21·76	19·55	18·51	21·30	23·14	24·47	27·51	25·85	23·53	25·17	29·60	24·3
Coorg	31·63	25·68	29·61	30·11	44·01	68·84	54·10	48·18	37·83	29·74	29·69	29·34	38·37
Bombay Presidency	32·38	28·10	29·48	31·26	33·65	37·54	43·60	46·62	40·80	34·40	31·62	27·60	34·88
Burma ... { Lower	22·88	24·18	21·32	24·75	23·81	26·93	31·36	31·12	28·59	24·01	25·13	27·01	26·00
Burma ... { Upper	27·23	24·37	25·40	26·53	24·22	26·47	30·38	30·65	28·76	29·11	33·41	39·59	28·95
Ajmer-Merwara	39·52	45·69	58·80	43·00	39·03	28·88	22·54	40·91	50·18	32·57	28·37	28·67	38·25
India ...	31·89	27·20	28·66	31·63	30·01	29·23	27·02	27·55	30·97	28·95	29·14	33·25	29·71

* The ratios in this statement have been calculated with reference to the number of days in each month.

TABLE NO. XX.—*Deaths from cholera in the different provinces in India from 1881 to 1912.*

YEAR.	Delhi.	* Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.-W. Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1881	...	79,180	...	5,010	25,865	5,207	...	9,140	3,404	9,446	3	16,694	5,239	...	16	197	581	1,721	25
1882	...	182,352	...	21,055	89,372	39	...	11,932	3,573	23,604	31	7,904	7,177	...	289	1,327	1,562	150	893
1883	...	90,439	...	14,908	18,160	190	...	16,235	27,897	36,284	...	37,954	2,185	...	87	797	1,740	1,947	124
1884	...	134,421	...	22,276	30,143	614	...	149	87	75,476	...	13,804	5,515	...	227	1,297	1,018	2,479	330
1885	...	173,767	...	7,753	63,457	1,936	...	21,868	3,683	58,109	...	37,287	7,685	...	100	1,615	4,624	1,387	2,677
1886	...	118,368	...	20,188	34,565	12	...	16,679	976	12,417	...	167	4,027	...	765	173	290	499	10
1887	...	172,578	...	7,941	200,628	8,804	...	12,576	14,396	28,359	3	25,711	2,649	...	384	2,612	8,868	2,831	832
1888	...	111,391	...	9,693	18,704	14,938	...	921	305	58,677	2	36,500	15,982	...	13	32	191	2,057	1,015
1889	...	171,103	...	18,288	48,494	2,838	...	52,588	10,935	76,020	9	37,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	...	145,885	...	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	...	229,575	...	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,100	...	532	2,946	13,474	3,102	1,204
1892	...	259,398	...	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	...	126,976	...	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	...	236,150	...	13,497	178,079	113	...	7,043	3,452	42,289	8	33,588	7,428	...	...	2	5,210	1,862	328
1895	...	177,087	...	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	...	226,824	...	17,042	69,147	5,146	...	52,985	12,264	47,847	49	35,494	2,959	...	12	3,797	15,766	525	2,100
1897	...	196,247	...	33,240	44,208	622	...	57,131	10,122	143,445	106	57,109	8,538	...	19	1,496	13,202	1,039	4,248
1898	...	65,920	...	11,149	2,508	339	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	...	107,678	...	8,380	8,142	1,816	...	76‖	541	29,082	...	8,579	4,942	2,050	1	498	...	...	123
1900	...	345,878	...	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	...	110,753	...	7,468	53,995	180	117	49	17	81,370	58	13,606	3,552	‡	50	6	72	1	11,351
1902	...	150,971	...	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	...	203,405	...	8,360	47,159	14,688	1,354	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	...	137,701	...	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	...	146,339	...	142,312**	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	...	192,596	...	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	...	205,702	...	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	413	1	4,972
1908	...	268,908	...	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,730	937	2,449
1909	...	56,711	...	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	403	1,421	164	1,629
1910	...	162,611	...	117,969	102,402	2,131	1,605	5,316	...	32,594	56	3,694	1,834	177	2	8	2,864	2	1,812
1911	...	124,560	...	39,248	117,689	1,260	12	2,998	...	58,174	6	5,817	2,595	1,596	50	85	1,054	803	210
1912	406	95,467	77,023	(b) 14,303	18,894	1,833	1,329	34,313	...	92,497	...	64,505	6,013	1,173	13	414	9,080	1,190	6,748

* Excluding Calcutta from 1881 to 1892.
† Statistics from 1881 to 1838 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1881-1900 included in the Punjab.
(b) Assam only.

TABLE NO. XXI.—*Deaths from cholera in British Provinces, by months, during the year 1912.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	RATIO PER 1,000 OF POPULATION. 1912.	1911.
Delhi ...	...	...	...	7	178	63	44	47	61	6	...	...	406	1·03	...
Bengal ...	10,558	8,991	14,014	20,936	9,709	3,142	2,080	1,767	2,470	2,140	6,995	12,665	95,467	2·10	1·49
Bihar and Orissa.	591	644	2,000	3,740	24,065	21,933	7,059	8,516	4,743	1,885	999	848	77,023	2·24	...
Assam ...	605	297	787	1,644	2,035	2,416	1,148	536	663	1,039	1,396	1,537	14,303	2·36	...
United Provinces of Agra and Oudh.	260	187	460	3,523	4,844	2,589	370	1,500	2,568	1,880	601	112	18,894	·40	2·51
Punjab ...	...	2	4	11	84	256	272	263	730	198	8	5	1,833	·09	·06
North-West Frontier Province.	...	...	...	...	...	5	274	452	561	35	1	1	1,329	·65	·01
Central Provinces and Berar.	41	30	116	214	1,239	1,863	1,421	8,432	15,247	5,260	376	74	34,313	2·46	·22
Madras Presidency.	15,041	4,291	3,922	2,950	5,218	7,085	8,182	14,390	8,902	5,713	6,458	10,345	92,497	2·3	1·4
Coorg ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	·03
Bombay Presidency.	280	273	494	2,706	6,237	13,323	19,224	14,386	4,717	1,891	423	551	64,505	3·29	·30
Burma { Lower	404	337	240	443	409	576	1,122	920	484	287	308	483	6,013	·94	·41
Burma { Upper	42	1	10	20	1	31	44	104	147	251	300	222	1,173	·34	·46
Ajmer-Merwara.	...	...	...	...	...	...	...	7	6	...	...	...	13	·03	·10
Total ...	27,822	15,053	22,047	36,194	54,219	53,282	41,240	51,320	41,299	20,585	17,865	26,843	407,769	1·71	1·48

TABLE NO. XXII.—*Details of the distribution and occurrence of Cholera during the year 1912.*

Province.	Mortality in 1912.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Delhi	1·03	·05	·45	1·85	6·78	...	...	May.
Bengal	2·10	2·45	2·55	2·07	12·67	6·61	10·80	April.
Bihar and Orissa	2·24	3·17	2·86	2·22	6·62	7·10	32·83	May.
Assam	2·36	2·68	2·13	2·37	9·35	6·41	10·67	June.
United Provinces of Agra and Oudh	·40	1·47	·49	·40	3·19	2·79	6·59	May.
Punjab	·09	·18	·28	·08	·73	·44	11·07	September.
North-West Frontier Province ...	·65	·48	·92	·62	5·56	·96	21·40	September.
Central Provinces and Berar ...	2·46	·42	2·81	2·43	8·16	14·66	32·3	September.
Madras Presidency	2·3	1·9	2·4	2·3	19·43	9·0	25·0	January.
Coorg	...	·53	...	...	...	...	...	...
Bombay Presidency	3·29	·51	2·19	3·47	19·14	9·15	28·13	July.
Burma { Lower	·94	·90	2·06	·78	4·56	3·36	22·57	July.
Burma { Upper	·34	·79	1·16	·26	2·94	·87	5·64	November.
Ajmer-Merwara	·03	·02	Not available.		·27	Not available.		August.

TABLE NO. XXIII.—*Small-pox mortality—1912.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	273	525	120	246	71	1,091	112	335	1,959	13	684	454	27	402	6,312
February	109	580	155	321	65	1,005	100	604	1,832	8	817	837	40	585	7,058
March	25	816	307	459	218	1,545	84	611	1,798	16	1,099	974	124	1,027	9,103
April	31	1,729	528	735	458	2,515	107	744	1,545	12	1,086	1,178	428	640	11,726
May	21	1,254	402	797	475	3,112	82	640	1,420	...	767	1,126	647	280	11,023
June	21	885	295	620	585	3,246	94	436	1,140	3	577	701	312	61	8,976
July	12	813	140	445	400	3,305	116	381	1,069	...	332	382	138	25	7,558
August	3	359	72	206	170	1,708	150	234	1,062	...	194	129	61	10	4,358
September	2	318	63	246	58	857	121	149	1,074	1	100	100	12	1	3,102
October	7	245	76	117	38	1,181	267	102	931	...	108	69	3	2	3,146
November	4	228	88	174	147	3,307	349	92	952	...	179	92	11	5	5,628
December	9	535	111	340	416	3,467	435	228	1,312	...	388	75	39	12	11,367
Total ...	517	8,287	2,357	4,696	3,101	30,339	2,017	4,556	16,094	53	6,331	6,117	1,842	3,050	89,357
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1912.	1·31	·18	·06	·77	·7	1·57	·99	·33	·4	·30	·32	·96	·53	6·08	·37
Ratio per 1,000 of population, 1911.	...	·17	·09	·29	·03	·25	·47	·12	·6	1·70	·24	·88	·10	3·00	·25
Difference ...	...	+·01	—·03	+·48	+·04	+1·32	+·52	+·21	—·2	—1·40	+·08	+·08	+·43	+3·08	+·12
Mean ratio per 1,000 during 1907-1911.	·18	·36	·44	·51	·78	·52	·38	·31	·6	·68	·20	·37	·16	1·15	·42
Difference ...	+1·13	—·18	—·38	+·26	—·31	+1·05	+·61	+·02	—·2	—·38	+·12	+·59	+·37	+4·93	—·05
II.—District mortality excluding towns :—															
Number of districts affected	...	25	19	8	37	27	5	23	24	4	25	19	11	Not available.	227
Highest district ratio ...	...	·70	·40	1·89	·61	4·17	1·42	1·06	1·2	·72	1·32	2·75	·77		4·17
Name of that district ...	...	Mymensingh.	Bhagalpur.	Kamrup.	Mainpuri.	Montgomery.	Hazara.	Nagpur.	Coimbatore.	Nanjarajpatna.	Karachi.	Prome.	Minbu.		Montgomery.
Lowest district ratio ...	...	·002	·002	·006	·01	·14	·12	·01	·05	·11	·06	·01	·05		·002
Name of that district ...	...	Jalpaiguri.	Shahabad.	Lakhimpur.	Basti.	Kangra.	Bannu.	Chhindwara.	Vizagapatam.	Padinalknad Taluk.	Ahmednagar.	Mergui.	Lower Chindwin.		Jalpaiguri.
Number of districts without mortality.	...	1	1	...	11	1	...	1	...	1	...	...	...		16
District death rate per 1,000 of population.	...	·18	·06	·77	·05	1·46	·95	·25	·4	·30	·24	·82	·32		·33†
III.—Town mortality :—															
Number of towns affected.	...	36	16	7	53	118	8	50	102	1	43	35	15	Not available.	485
Highest town ratio ...	...	2·84	3·24	2·88	5·01	18·35	11·14	5·58	4·5	·80	8·36	19·12	16·09		19·12
Name of that town ...	...	Suri.	Sahibganj.	Gauhati.	Ferozeabad.	Pindigheb.	Nowshera Kalan.	Nagpur.	Sattur.	Virajendrapet.	Umarkot.	Nyaunglebin.	Taungdwingyi.		Nyaunglebin.
Lowest town ratio ...	...	·01	·01	·16	·02	·10	·10	·05	·02	...	·03	·03	·05		·01
Name of that town ...	...	Manik Talla.	Cuttack.	Goalpara.	Fyzabad Ajodhya.	Rohtak.	Kulachi.	Jubbulpore Cantt.	Conjeeveram.	Mercara.	Nasik.	Akyab.	Pakokku.		Manik Talla.
Number of towns without mortality.	...	76	39	12	40	11	5	54	167	1	22	5	3		435
Town death rate per 1,000 of population.	...	·12	·10	·74	·22	2·68	1·36	1·11	·2	·30	·85	1·92	2·75		·71†
IV.—Infantile mortality :—															
Children under one year	264	1,296	502	770	1,177	9,000	602	1,491	6,313	6	1,647	459	103	1,252	24,882
Children 1—10 years ...	200	2,445	996	1,572	1,538	15,691	1,161	2,218	4,971	8	2,532	1,232	259	1,771*	36,594
Percentage of children in total small-pox mortality.	89·75	45·14	63·56	49·87	87·55	81·38	87·41	81·41	79·11	26·42	66·01	27·64	19·65	99·11	68·80

*Under 12 years. †Excluding Ajmer-Merwara.

TABLE NO. XXIV.—*Fever mortality—1912.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months.															
January	840	97,301	59,674	6,554	91,848	21,161	2,660	18,974	29,968	375	22,687	3,892	2,504	1,096	359,534
February	715	63,910	41,450	5,165	75,400	18,274	2,631	14,851	21,361	286	19,073	3,831	1,926	1,068	269,951
March	649	67,678	50,445	5,374	87,641	22,034	2,565	18,115	22,055	362	23,106	3,683	2,334	1,267	307,308
April	747	89,334	962,285	5,802	94,886	21,818	2,270	18,727	20,482	360	22,319	4,077	2,419	920	346,446
May	838	66,367	60,089	7,027	97,455	24,919	2,571	27,160	24,323	580	23,265	3,824	1,868	1,187	341,473
June	898	59,803	55,727	7,557	94,791	23,759	2,949	22,822	24,047	888	21,684	4,038	2,205	997	322,165
July	644	67,535	51,098	7,199	70,126	21,346	2,794	17,029	26,280	685	24,062	5,059	2,703	777	297,338
August	616	58,880	48,142	6,539	59,901	18,275	2,675	21,380	28,583	605	28,166	5,076	2,694	1,506	283,038
September	953	76,086	55,144	6,525	68,774	22,603	2,495	31,286	27,773	459	26,961	4,645	2,648	1,838	328,190
October	844	84,145	52,365	6,634	71,797	25,440	2,671	35,144	26,017	367	26,823	4,303	2,900	1,231	340,681
November	995	98,367	52,028	6,459	67,858	26,216	3,120	24,652	25,027	358	25,689	4,815	3,365	1,039	339,988
December	938	129,787	56,479	7,483	87,023	29,195	3,476	20,922	30,555	372	22,486	6,044	5,114	1,000	399,974
Total ...	9,687	959,193	644,926	78,318	967,500	275,040	32,877	270,162	306,471	5,697	286,321	53,287	32,680	13,926	3,936,085
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1912.	24·63	21·16	18·80	12·94	20·66	14·22	16·11	19·41	7·6	32·56	14·62	8·35	9·41	27·77	16·49
Ratio per 1,000 of population, 1911.	...	19·46	...	...	27·94	15·33	17·48	16·85	7·4	26·03	11·38	7·87	7·42	34·95	17·63
Difference ...	...	+1·70	...	...	−7·28	−1·11	−1·37	+2·56	+·2	+6·53	+3·24	+·48	+1·99	−7·18	−1·14
Mean ratio per 1,000 during 1907-1911.	33·08	20·55	22·00	14·66	31·11	21·66	21·12	15·85	7·8	27·75	13·00	9·33	8·28	29·29	20·04
Difference ...	−8·45	+·61	−3·20	−1·72	−10·45	−7·44	−5·01	+3·56	−·2	+4·81	+1·62	−·98	+1·13	−1·52	−3·55
II.—District mortality excluding Towns :—															
Number of districts affected. ...	26	20	8	48	28	5	24	24	5	25	19	11		243	
Highest district ratio ...	36·44	27·32	27·90	29·12	18·67	18·00	28·83	20·4	48·16	36·52	15·78	19·70		48·16	
Name of that district ...	Malda	Purnea	Goalpara	Bulandshahr.	Mianwali	Peshawar	Hoshangabad.	Vizagapatam.	Padinalknad Taluk.	Ahmedabad.	Thayetmyo.	Mandalay		Padinalknad Taluk	
Lowest district ratio ...	11·17	8·10	9·71	14·03	5·36	14·54	8·58	2·2	27·16	5·46	2·35	4·93	Not available.	2·2	
Name of that district ...	Howrah	Puri	Sylhet	Dehra Dun.	Simla	Bannu	Buldana	Bellary	Yedenalknad Taluk.	Belgaum	Maubin	Meiktila		Bellary	
Number of districts without mortality. ...	...	...	...	...	...	...	...	...	...	...	...	...		...	
District death rate per 1,000 of population. ...	22·00	19·14	13·03	20·84	14·44	16·64	20·15	7·9	33·48	15·30	8·87	9·93		17·03	
III.—Town mortality :—															
Number of towns affected ...	112	55	19	93	129	13	104	260	2	65	41	18		911	
Highest town ratio ...	41·60	33·22	17·02	39·01	27·81	15·02	45·80	21·5	17·51	49·67	16·51	14·84		49·67	
Name of that town ...	Malda	Dumka	North-Lakhimpur.	Shikarpur	Kot Mithan.	Nawashahr.	Harda	Mudugula	Virajendrapet.	Umarkot	Shwegyin.	Salim		Umerkot.	
Lowest town ratio ...	2·43	1·91	3·42	5·39	2·04	2·62	·50	·2	17·29	1·65	1·80	1·22	Not available.	·2	
Name of that town ...	Tittaghar	Daudnagar.	Hailakandi.	Bahraich	Khangah Dogran.	Hecketganj Khwajaganj.	Deulgaon	Aiyabad	Mercara	Ranebennur.	Moulmein.	Myingyan.		Aiyabad.	
Number of towns without mortality. ...	...	...	...	...	...	...	...	9	...	...	...	...		9	
Town death rate per 1,000 of population. ...	8·82	9·47	8·60	17·67	11·95	10·99	11·80	5·3	17·33	10·42	4·70	3·85		*10·13	

*Excluding Ajmer-Merwara.

TABLE NO. XXV.—*Dysentery and Diarrhœa mortality—1912.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	24	2,751	2,269	898	1,125	613	18	2,667	7,279	9	2,862	588	115	23	21,240
February	22	1,893	1,734	632	913	518	9	2,285	5,138	6	2,572	592	122	19	16,455
March	12	1,957	2,193	700	1,151	598	22	3,015	4,601	5	2,945	470	110	34	17,813
April	15	2,540	2,292	941	1,439	722	33	3,126	4,220	3	2,313	793	121	45	19,513
May	13	2,099	2,181	1,302	1,912	980	30	3,905	4,945	25	4,386	852	132	53	22,81[illegible]
June	18	1,648	1,909	1,675	1,671	761	20	3,244	5,683	51	4,971	1,037	194	33	23,915
July	27	1,758	2,228	1,428	1,309	643	23	3,910	6,727	38	6,896	1,461	343	24	26,815
August	25	1,667	2,720	1,085	1,247	809	25	7,795	7,620	34	8,480	1,277	383	56	33,223
September	25	2,175	2,528	1,120	1,240	1,238	33	11,293	6,450	18	7,288	913	254	110	34,685
October	47	2,419	2,648	1,208	1,049	1,046	22	8,980	5,864	19	5,849	573	180	47	29,351
November	32	2,638	1,720	1,166	942	976	33	5,203	6,129	13	4,057	498	144	40	23,591
December	28	3,790	2,200	1,086	988	881	21	3,402	7,257	10	3,420	499	150	68	23,800
Total ...	288	27,335	26,022	13,241	14,986	9,785	289	58,825	71,913	231	57,039	9,463	2,248	551	292,216
B.—Annual death ratios—															
Ratio per 1,000 of population, 1912.	·73	·60	·75	2·19	·32	·51	·14	4·23	1·8	1·32	2·91	1·48	·65	1·10	1·22
Ratio per 1,000 of population, 1911.	...	·49	...	...	·51	·59	·13	3·15	1·6	·66	1·61	1·27	·71	1·19	1·06
Difference ...	...	+·11	...	...	—·19	+·08	+·01	+1·08	+·2	+·66	+1·30	+·21	—·06	—·09	+·16
Mean ratio per 1,000 during 1907-1911.	·70	·49	1·00	2·56	·41	·69	·19	3·13	1·6	1·55	2·23	1·50	·74	1·10	1·14
Difference ...	+·03	+·11	—·25	—·37	—·09	—·18	—·05	+1·10	+·2	—·23	+·68	—·02	—·09	...	+·08
II.—District mortality excluding towns :—															
Number of districts affected ...	...	26	20	8	48	28	5	24	24	5	25	19	...		243
Highest district ratio ...	...	4·61	4·80	4·97	6·14	3·64	·51	13·32	5·7	1·43	8·06	2·28	·82		13·32
Name of that district ...	...	Howrah	Puri	Lakhimpur	Garhwal	Rawalpindi	D.I. Khan	Akola	Nilgiris	Kiggatnad Taluk.	Sholapur	Mergui	Pakokku		Akola
Lowest district ratio ...	...	·04	·01	·43	·01	·05	·01	·29	·4	·35	·04	·21	·19		·01
Name of that district ...	...	Malda	Purnea	Goalpara	Muzaffarnagar	Attock	Kohat	Bhandara	Vizagapatam	Yedenalknad Taluk.	Larkhana	Toungoo	Yamethin		Muzaffarnagar.
Number of districts without mortality.	...	...	...	...	...	...	...	...	...	...	...	...	...		...
District death rate per 1,000 of population.	...	·48	·71	2·18	·22	·40	·10	4·17	1·5	·68	2·73	1·22	·55		1·08*
III.—Town mortality :—														Not available.	
Number of towns affected ...	...	111	49	17	85	122	11	102	243	2	65	39	16		862
Highest town ratio ...	...	9·65	8·12	4·53	6·77	9·03	1·70	21·64	11·8	18·86	14·45	5·88	4·19		21·64
Name of that town ...	...	Kamarhati.	Puri	Dibrugarh	Saran	Isa Khel	Bannu	Nandura	Palamcottah	Virajendrapet	Poona	Myanaung	Pyinmana		Nandura
Lowest town ratio ...	...	·12	·11	·80	·06	·19	·16	·51	·04	7·82	·11	·60	·47		·04
Name of that town ...	...	Dhulian	Jagdeshpur	Habiganj	Mainpuri	Dinga	Becketganj Khwajagarj.	Umrer	Bodinayakanur	Mercara	Shikarpur	Kyaukpyu	Taungdwingyi		Bodinayakanur
Number of towns without mortality.		1	6	2	8	7	2	2	26	...	...	2	2		58
Town death rate per 1,000 of population.	...	2·32	1·94	2·47	1·65	1·61	·51	4·82	3·8	11·92	4·04	3·33	1·68		2·92*

*Excluding Ajmer-Merwara.

TABLE NO. XXVI.—*Plague mortality—1912.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL. 1912.	TOTAL. 1911.
BRITISH PROVINCES.														
Delhi	14	8	4	40	17	...	...	...	...	10	...	97	...	
Bengal	58	214	572	635	253	112	35	22	18	17	27	32	1,995	1,879
Bihar and Orissa ...	8,176	14,807	17,875	11,461	2,773	293	67	116	169	213	552	1,822	58,324	73,839
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh	17,850	28,981	34,904	19,799	3,886	364	54	196	505	807	2,081	5,518	114,945	332,220
Punjab	982	2,357	5,700	11,471	7,266	1,168	40	8	50	130	334	299	29,805	175,345
North-West Frontier Province	...	...	...	1	...	...	...	...	...	...	...	...	1	243
Central Provinces and Berar	4,867	6,369	6,159	1,289	42	1	...	...	33	143	148	148	19,199	27,938
Madras Presidency ...	2,281	1,535	589	131	86	23	108	268	259	253	484	634	6,651	15,185
Coorg	8	1	...	...	...	...	...	...	...	...	...	...	9	57
Bombay Presidency ...	8,661	4,702	2,848	1,629	745	222	380	1,076	2,621	2,731	1,997	1,372	28,984	100,399
Burma { Lower ...	302	473	344	183	190	193	326	277	167	79	29	91	2,564	3,906
Burma { Upper ...	189	168	80	6	1	3	1	...	...	...	1	1	450	2,154
Ajmer-Merwara ...	...	...	...	11	1	1	...	...	...	...	...	...	13	346
TOTAL { 1912 ...	43,388	59,615	69,075	46,656	15,170	2,380	1,011	1,953	3,822	4,377	5,663	9,917	263,037	...
TOTAL { 1911 ...	80,953	92,587	171,369	170,880	87,429	11,842	5,980	11,902	24,091	27,917	21,974	26,658	...	733,582
NATIVE STATES, ETC.														
Bengal Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bihar and Orissa Native States.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	Not available
United Provinces of Agra and Oudh Native States.	34	65	272	482	197	4	...	16	37	14	35	95	1,161	3,669
Punjab Native States ...	223	448	756	1,457	1,694	441	20	5	15	22	57	135	5,273	23,001
Jammu and Kashmir States	9	31	87	109	95	33	...	...	...	...	...	1	*365	*1,096
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Rajputana	197	369	539	433	284	41	...	2	51	1,028	1,614	915	5,373	18,436
Central India	1,632	1,682	940	574	192	...	...	...	64	138	23	37	5,282	16,129
Native States in Central Provinces	184	140	25	3	...	...	...	...	...	...	...	...	352	373
Bombay Presidency Native States	569	527	281	83	22	28	60	242	381	571	650	400	3,814	17,469
Burma Native States ...	1	1	...	...	...	...	...	...	...	...	...	...	2	...
Hyderabad State ...	7,286	2,715	2,587	421	26	...	...	208	838	598	419	845	15,943	17,579
Mysore	1,547	742	298	92	36	41	175	467	549	467	562	400	5,376	14,617
Bangalore, Civil and Military Station	105	74	41	16	3	6	11	17	33	45	61	55	467	848
Madras Native States ...	23	7	...	13	...	...	...	...	...	...	...	...	43	71
TOTAL { 1912 ...	11,810	6,701	5,826	3,683	2,459	594	266	957	1,968	2,883	3,421	2,883	43,451	...
TOTAL { 1911 ...	11,080	10,923	14,326	17,382	10,420	2,534	1,942	4,687	7,269	11,247	10,412	11,069	...	113,291
GRAND TOTAL { 1912 ...	55,198	66,316	74,901	50,339	17,629	2,974	1,277	2,920	5,790	7,260	9,084	12,800	306,488	...
GRAND TOTAL { 1911 ...	92,033	103,510	185,695	188,262	97,849	14,376	7,922	16,589	31,360	39,164	32,386	37,727	...	846,87
Calcutta City	57	183	499	598	238	108	34	22	18	16	27	31	1,831	1,736
Bombay City	33	101	306	610	347	92	61	59	41	19	21	24	1,714	3,997
Madras City	...	...	...	...	...	...	...	...	...	...	...	1	1	3

* Jammu Province only.

TABLE NO. XXVII.—*Mortality from Respiratory Diseases—1912.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces:—															
A.—Deaths by months—															
January	265	1,191	737	345	1,959	3,567	127	3,840	3,908	10	5,868	412	214	58	22,501
February ...	234	841	640	254	1,704	3,190	129	3,170	3,009	9	4,991	423	187	48	18,825
March	184	881	661	276	1,900	3,782	125	3,869	2,827	6	5,958	362	204	50	21,085
April	221	768	595	307	1,488	3,662	118	3,435	2,546	3	5,859	418	215	36	19,671
May	274	687	484	252	1,512	3,637	129	3,660	2,993	...	5,674	343	191	33	19,869
June	271	701	445	260	1,403	3,280	181	3,210	3,097	3	5,088	393	174	15	18,521
July	259	723	511	260	1,299	3,976	126	2,652	3,174	13	5,778	426	214	19	18,530
August...	248	794	436	287	1,411	3,023	133	3,638	3,338	7	7,076	534	200	26	21,151
September	329	805	406	274	1,585	3,856	116	4,907	3,213	11	6,619	557	235	20	22,433
October	357	843	458	314	1,401	3,184	128	4,645	3,210	5	6,047	473	245	19	21,329
November	397	916	458	306	1,392	3,526	114	3,898	3,458	6	6,099	378	233	23	21,204
December	321	1,202	666	323	1,736	4,154	110	3,805	3,843	6	5,655	501	225	50	22,617
Total ...	3,360	10,352	6,497	3,458	18,810	41,447	1,636	44,729	38,616	75	70,712	5,220	2,527	397	247,736
B.—Annual death ratios—															
Ratio per 1,000 of population—1912.	8·54	·22	·18	·52	·40	2·14	·75	3·21	·9	·43	3·61	·82	·73	·79	1·04
Ratio per 1,000 of population—1911.	...	·22	...	...	·53	2·30	·69	2·61	·9	·38	2·63	·84	·63	·63	·94
Difference ...	...	...	...	...	—·13	—·16	+·06	+·60	...	+·05	+·98	—·02	+·10	+·16	+·10
Mean ratio per 1,000 during 1907-1911.	9·82	·20	·20	·51	·44	2·54	·84	2·46	·8	·33	2·97	·87	·71	·59	·98
Difference ...	—1·28	+·02	—·02	+·06	—·04	—·40	—·09	+·75	+·1	+·10	+·64	—·05	+·02	+·20	+·06
II.—District mortality excluding towns—															
Number of districts affected... ...		26	20	8	47	28	5	24	24	2	25	19	11		239
Highest district ratio ...	...	1·10	1·82	1·85	9·91	10·15	1·46	13·16	2·7	·16	10·82	·80	1·43		13·16
Name of that district ...	...	Howrah	Puri	Lakhimpur.	Hamirpur.	Gurdaspur	Hazara	Nimar	Anantapur.	Yedenaikkanad. Taluk.	Kaira	Henzada	Shwebo		Nimar
Lowest district ratio ...	...	·005	·002	·06	·01	·002	·17	·23	·2	·05	·01	·02	·04		·002
Name of that district ...	...	Noakhali	Purnea	Goalpara	Basti	Multan	Peshawar	Bhandara.	Vizagapatam.	Nanjarajpatna. Taluk.	Upper Sind Frontier	Toungoo	Meiktila	Not available.	Purnea
Number of districts without mortality.	...	...	...	...	1	...	...	...	...	3	...	...	...		4
District death rate per 1,000 of population.	...	·08	·17	·57	·24	1·92	·55	2·99	·9	·05	2·78	·36	·29		·81*
III.—Town mortality—															
Number of towns affected ...	...	90	44	12	87	124	13	103	209	2	64	35	17		800
Highest town ratio ...	...	8·05	2·34	4·48	17·50	10·08	5·98	16·02	7·8	8·35	17·47	10·56	12·64		17·50
Name of that town ...	...	Maniktalla.	Puri	Tezpur	Rath	Narowal	Haripur	Sehara	Tellicherry	Virajendrapet.	Ahmedabad.	Yandoon	Myingyan		Rath
Lowest town ratio ...	...	·04	·04	·16	·05	·17	·33	·18	·05	5·74	·29	·16	·25	Not available.	·04
Name of that town ...	...	Nawabganj.	Sassaram	Habiganj	Deoband	Multan	Beckettganj, Khwajaganj.	Ratanpur.	Ambur	Mercara	Shikarpur	Zalun	Yamethin		Nawabganj
Number of towns without mortality ...	...	22	11	7	6	5	...	1	60	...	1	6	1		120
Town death rate per 1,000 of population. ...	...	2·35	·68	·74	2·62	4·47	2·70	5·53	1·8	6·71	8·72	4·00	5·38		3·62*

* Excluding Ajmer-Merwara.

TABLE NO. XXVIII.—*Vaccination.*

A.—*Total primary vaccinations and re-vaccinations; successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1912-13.*

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of persons vaccinated by each vaccinator of the Special Staff.	Total cost of the Special† Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccination.	Primary.	Re-vaccination.	Under one year.	1 to 6 years			
								Rs.	Rs. A. P.
Delhi	11,267	1,965	98·13	65·25	9,962	683	2,205	2,403	0 3 3
Bengal	1,787,143	197,256	98·24	61·29	633,957	918,206	1,345	172,212	0 1 6
Bihar and Orissa	1,269,400	26,913	99·59	69·35	651,263	575,645	1,131	82,305	0 1 0
Assam	298,983	34,380	97·91	73·99	66,191	183,398	964	66,343	0 3 6
United Provinces of Agra and Oudh	1,468,162	124,276	97·19	73·12	987,814	376,593	1,729	180,512	0 1 9
Punjab	710,994	321,853	97·99	73·50	532,665	115,795	3,735‡	125,812	0 2 4
North-West Frontier Province ...	125,109	27,631	99·01	88·88	73,112	33,234	3,968§	15,236	0 1 8
Central Provinces and Berar ...	503,956	70,554	98·29	72·90	395,336	86,124	1,954	69,385	0 2 1
Madras	1,461,790	124,554	88·4	79·0	568,905	563,558	1,888‖	¶328,342	0 3 11
Coorg	8,977	4,096	94·64	81·98	617	4,133	1,414	2,876	0 4 2
Bombay	711,222	70,948	97·99	53·19	511,423	115,490	1,760	376,586	0 9 2
Burma	422,089	122,263	96·69	67·64	97,388	197,403	**1,930	205,199	0 7 3
Ajmer-Merwara	13,825	117	95·21	93·17	10,802	1,772	911	3,216	0 3 11
Total ...	8,792,917	1,126,806	96·54	70·57	4,538,535	3,171,944	1,630	1,630,427	0 2 11

* Excluding those the results of which were not known.
† Excluding dispensaries.
‡ Including vaccinations performed in Cantonments.
§ Including vaccinations performed in Cantonments and Political Agencies.
‖ Excludes average of work done by each medical subordinate.
¶ Excluding Madras Presidency town.
** Excluding the work done by private medical practitioners.

B.—*Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1912-13.*

Province.	Population.	Number of operations (primary and revaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small-pox.*	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Delhi	393,356	13,232	...	13,232	29·48	63·32	517	1·31
Bengal	43,471,942	1,890,112	94,287	1,984,399	40·79	36·41	8,287	·18
Bihar and Orissa	34,635,017	1,237,294	59,019	1,296,313	36·84	47·01	2,357	·06
Assam	7,059,857	331,773	1,590	333,363	44·57	23·44	4,696	·77
United Provinces of Agra and Oudh ...	46,835,108	1,591,505	933	1,592,438	31·84	52·73	3,101	·07
Punjab	19,566,432	1,022,244	10,603	1,032,847	43·93	68·06	30,339	1·57
North-West Frontier Province ...	2,908,002	152,434	306	152,740	49·11	62·85	2,017	·99
Central Provinces and Berar	13,916,308	573,687	823	574,510	38·18	71·02	4,556	·33
Madras	41,390,849†	1,586,106	238	1,586,344	31·7	34·36	16,094	·4
Coorg	174,976	12,826	247	13,073	64·66	8·82	53	·30
Bombay	22,657,077	773,471	8,699	782,170	29·06	56·43	6,331	·32
Burma	12,115,217	533,647	10,705	544,352	38·62	20·10	7,959	·81
Ajmer-Merwara	501,395	13,942	Not available	13,942	25·94	53·86	3,050	6·08
Total ...	245,625,536	9,732,273	187,450	9,919,723	36·49	46·19	89,357	·37

* For the Calendar year, from the Provincial Sanitary reports.
† Excluding the population of Bangalore and Secunderabad Cantonments.

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EAST INDIA (SANITARY MEASURES).

REPORT

ON

SANITARY MEASURES IN INDIA

IN

1913-1914.

VOL. XLVII.

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TABLE OF CONTENTS.

SECTION I.

EUROPEAN ARMY OF INDIA.

PARA.		PAGE.
1.	India	1
2.	Deaths from all causes	2
3.	Enteric fever	2
	Paratyphoid fever	4
	Anti-enteric inoculation	5
	Enterica	8
4.	Mediterranean fever	10
5.	Pyrexia of uncertain origin	10
6.	Malaria	12
7.	Sandfly fever	15
8.	Plague	15
9.	Cholera	15
10.	Small-pox	16
11.	Measles	16
12.	Scarlet fever	16
13.	Dengue	16
14.	Rabies	16
15.	Kala-Azar	17
16.	Beri-beri	17
17.	Dysentery and Liver Abscess	18
18.	Colitis	19
19.	Ear diseases	19
20.	Oriental sore	20
21.	Heat-stroke and Sun-stroke	20
22.	Poisoning	20
23.	Venereal diseases	21
24.	Invaliding	23
25.	Officers	25
26.	Women	26
27.	Children	27

SECTION II.

INDIAN ARMY.

28.	India	29
29.	Geographical groups	31
30.	Northern and Southern Armies, Divisions	31
31.	Stations and Regiments	31
32.	Cholera	38
33.	Small-pox	32

PARA.		PAGE.
34.	Malaria	32
35.	Pyrexia of uncertain origin	33
36.	Sandfly fever	34
37.	Enteric fever	35
38.	Dengue	36
39.	Mediterranean fever	36
40.	Kala-Azar	36
41.	Relapsing fever	36
42.	Beri-beri	36
43.	Plague	36
44.	Scurvy	37
45.	Tubercle of the lungs	37
46.	Pneumonia	37
47.	Dysentery	38
48.	Colitis	38
49.	Venereal diseases	38
50.	Suicides	39
51.	Ankylostomiasis	39
52.	Guinea-worm disease	39
53.	Commissioned British Officers	39

SECTION III.

GENERAL POPULATION.

54.	Meteorology, crops and general conditions	41
55.	Births and deaths	41
56.	Chief diseases	42
57.	Delhi	43
58.	Bengal	43
59.	City of Calcutta	44
60.	Port of Calcutta	45
61.	Assam	45
62.	Bihar and Orissa	46
63.	United Provinces	48
64.	Punjab	50
65.	North-West Frontier Province	52
66.	Central Provinces	52
67.	Madras	53
68.	City of Madras	54
69.	Coorg	55
70.	Bombay	55
71.	City and Port of Bombay	56
72.	Burma	57
73.	Rangoon	58
74.	Ajmer-Merwara	58
75.	Haj Pilgrimage 1912-13	59
76.	Deaths of civil officers and pensioners	59

SECTION IV.

JAILS OF INDIA.

PARA.		PAGE.
77.	Agricultural conditions	61
78.	The prison population in 1913	61
79.	Total sickness and mortality rates	61
80.	Malaria	61
81.	Dysentery	62
82.	Tubercle of the lungs	62
83.	Cholera	63
84.	Enteric fever	63
85.	Fevers of uncertain origin	63
86.	Bengal	63
87.	Assam	63
88.	Bihar and Orissa	64
89.	United Provinces	64
90.	Punjab	65
91.	North-West Frontier Province	66
92.	Central Provinces	66
93.	Bombay	66
94.	Madras	67
95.	Burma	67
96.	Andamans	68

SECTION V.

VACCINATION.

97.	Vaccination in India	69
98.	Vaccine lymph	70
99.	Delhi	70
100.	Bengal	70
101.	Bihar and Orissa	71
102.	Assam	72
103.	United Provinces	73
104.	Punjab	74
105.	North-West Frontier Province	75
106.	Central Provinces	75
107.	Madras	76
108.	Coorg	77
109.	Bombay	77
110.	Burma	78
111.	Ajmer-Merwara	79
112.	Vaccination among troops	79

SECTION VI.

MEDICAL INSTITUTIONS.

A.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private-aided).

PARA.		PAGE.
113.	India	81
114.	Delhi	82
115.	Bengal (excluding Calcutta)	82
116.	Calcutta	82
117.	Assam	82
118.	Bihar and Orissa	82
119.	Central Provinces	83
120.	United Provinces	83
121.	Punjab	83
122.	North-West Frontier Province	83
123.	Baluchistan	84
124.	Burma	84
125.	Bombay	84
126.	Madras	84
127.	*B.—Civil Hospitals and Dispensaries (State-Special, Railway and Private non-aided).*	84
128.	*C.—Lunatic Asylums.*	86
129.	Bengal	87
130.	Assam	87
131.	Bihar and Orissa	87
132.	United Provinces	87
133.	Punjab	87
134.	Central Provinces	87
135.	Bombay	88
136.	Madras	88
137.	Burma	88
	D.—Medical Colleges.	
138.	Bombay	88
139.	Madras	88
140.	Punjab	88
141.	Bengal	88
142.	United Provinces	89
	E.—Medical Schools.	
143.	Assam	89
144.	Burma	89
145.	Bengal	89
146.	Bihar and Orissa	90
147.	United Provinces	90
148.	Punjab	90
149.	Bombay	90
150.	Madras	91
151.	The X-Ray Institute of India	91

SECTION VII.

SANITARY WORKS.

PARA.		PAGE.
152.	India	93
153.	Delhi	93
154.	Bengal	94
155.	Sanitary Board	95
156.	Assam	95
157.	Sanitary Board	96
158.	Bihar and Orissa	96
159.	Sanitary Board	97
160.	United Provinces	97
161.	Sanitary Board	98
162.	Punjab	98
163.	Sanitary Board	99
164.	North-West Frontier Province	100
165.	Central Provinces	100
166.	Sanitary Board	101
167.	Madras	101
168.	Coorg	103
169.	Bombay	103
170.	Sanitary Board	104
171.	Burma	104
172.	Sanitary Board	105
173.	Military Works	105

SECTION VIII.

GENERAL REMARKS.

174.	Laboratories	107
	Central Research Institute, Kasauli	107
	Bombay Bacteriological Laboratory	108
	King Institute of Preventive Medicine, Madras ...	108
	Pasteur Institute, Kasauli	109
	Pasteur Institute of Southern India, Coonoor	109
175.	Sanitary Conference	110
176.	Indian Research Fund Association...	115
177.	Bacteriological Department	115
178.	Sanitary Policy	115

REPORT

ON

SANITARY MEASURES IN INDIA 1913-14.

SECTION I.

EUROPEAN ARMY OF INDIA.

(*From the Director, Medical Services in India*).

1. The average strength of European troops in India during 1913 was 70,755 warrant officers, non-commissioned officers, and men. The details given in this report show that their health has been very satisfactory.

India.

The more important facts regarding the health statistics for 1913 are presented in the following table, and with them are recorded comparative statements for 1912 and for the five-year period 1908-12.

Period.	Average strength.	Admissions.	Deaths.	Invalids sent home.	Invalids finally discharged.	Average constantly sick.	Ratio per 1,000 of Strength.					Average period of illness of each soldier, calculated on average strength.	Average duration of each case of sickness.
							Admissions.	Deaths.	Invalids sent home.	Invalids finally discharged.	Average constantly sick.		
1908-12 ...	71,188	45,448	432	654	589	2,491·66	638·4	6·07	9·19	8·27	60·29	22·00	34·47
1912	71,001	38,901	328	474	422	2,049·28	547·9	4·62	6·68	5·94	28·86	10·56	19·28
1913	70,755	41,074	231	530	...	2,099·69	580·5	3·26	7·49	...	29·68	10·83	18·66

The increase in the number of admissions has been due chiefly to the prevalence of malaria, sandfly fever and dengue in the Northern Army, and to the large increase in the cases of ear disease admitted to hospital, the majority of which in previous years would have been treated in barracks as out-patients.

The following table gives the incidence of sickness among European troops in the principal stations in India in 1913 (stations having an average annual strength of over 1,000).

Stations.	Average strength.	Admissions.	Deaths.	Invalids sent home.	Average constantly sick.	Ratios per 1,000 of Strength. Admissions.	Deaths.	Invalids sent home.	Average constantly sick.
Peshawar	1,709	1,721	1	11	66·05	1,007·0	·59	6·44	38·65
Nowshera	1,082	983	4	8	31·31	908·5	3·70	7·39	28·94
Rawalpindi	2,799	3,143	15	26	123·16	1,122·9	5·36	9·29	44·00
Sialkot	1,134	759	3	7	32·47	669·3	2·65	6·17	28·63
Lahore Cantonment ...	1,146	1,435	4	5	1·20	1,252·2	3·49	4·36	44·68
Ferozepore	1,053	876	5	13	35·58	831·9	4·75	12·35	33·79
Ambala	2,003	1,376	5	29	81·21	687·0	2·50	14·48	40·54
Meerut	1,789	924	5	22	54·89	516·5	2·79	12·30	30·68
Bareilly	1,410	501	4	4	25·02	355·3	2·84	2·84	17·74
Ranikhet	1,675	552	3	12	34·60	329·6	1·79	7·16	20·66
Chakrata	1,154	216	2	3	13·21	187·2	1·73	2·60	11·45
Lucknow	2,569	1,356	9	16	70·38	522·8	3·50	6·23	27·40
Fort William	1,192	523	10	5	50·36	438·8	8·39	4·19	42·25
Quetta	3,460	1,785	9	37	87·86	515·9	2·60	10·69	25·39
Karachi	1,281	973	8	4	45·22	759·6	6·24	3·12	35·30
Mhow	1,823	886	8	17	51·40	486·0	4·39	9·32	28·20
Jhansi	1,057	584	4	7	33·41	552·5	3·78	6·62	31·61
Jubbulpore	2,267	1,324	3	21	62·77	584·0	1·32	9·26	27·69
Poona	1,962	896	5	19	71·17	456·7	2·55	9·68	36·27
Kirkee	1,159	539	1	5	34·69	465·1	·86	·31	29·93
Colaba	1,124	574	4	18	44·22	510·7	3·56	16·01	39·34
Belgaum	1,063	268	2	7	21·82	250·9	1·87	6·55	20·43
Secunderabad	3,140	1,233	7	38	68·04	392·7	2·23	12·10	21·67
Bangalore	2,155	795	6	13	39·55	368·9	2·78	6·03	18·35
Rangoon	1,024	625	8	12	40·77	610·4	7·81	11·72	39·81
Aden	1,084	587	1	2	29·63	541·5	·92	1·85	27·33

Deaths from all causes (in India).

2. There were 231 deaths as compared with 328 in 1912 and 354 in 1911. This is much the lowest number of deaths on record and represents a ratio of 3·26 per 1,000 of strength as compared with 4·62 in the previous year. The chief diseases that had a lessened mortality rate were enteric fever, malaria, liver abscess and dysentery. It may be stated that the death rate in 1913 was as low as that of the whole army at home and abroad, and it is not too much to expect that it may gradually approximate that of the troops in the United Kingdom.

The causes of death included :—enteric fever 16; paratyphoid fever 2; dysentery 8; malaria 9; pneumonia 16; tubercle of lung 11; other forms of local tuberculosis 2; multiple neuritis 2; appendicitis 6; sunstroke and heat-stroke 9; abscess of the liver 14; Mediterranean fever 2; kala-azar 3; hydrophobia 2; drowning 19; hanging 2; gunshot wounds 5 (2 suicidal); various forms of poisoning 5 (including 2 from chloroform inhalation, one from quinine and two from alcohol); and one each from sprue, beri-beri, inflammation of liver and congestion of liver.

Enteric Fever.

3. There were fewer cases of enteric fever and a lower mortality from that disease in 1913 than in any previous year. This diminution is more striking than at first sight appears, for with modern methods of diagnosis, it is probable that a

smaller proportion of cases of enteric fever escapes detection. The total number of admissions was 85 and deaths 16, as compared with 118 and 26, respectively, in 1912. This represents a ratio of 1·2 per 1,000 of strength for attacks, and a death rate of ·23, as contrasted with 1·7 and ·37, respectively, in the preceding year. The case mortality was 16·8 per cent. which is ·2 per cent. less than in the previous year. The garrisons which have yielded the largest number of cases are Rawalpindi, 13 with 2 deaths; Poona, 11 with no death; Sialkot, 9 with 3 deaths; Bangalore, 7 with 1 death; Lucknow, 4 with no death; Quetta, 3 with 1 death; Jhansi, 3; Murree, 3 with 2 deaths; Secunderabad, 3 with 1 death; and Colaba, 3 with 1 death; 5 other garrisons had 2 each, and 10 had one each.

The following table shows the distribution of both enteric fever and paratyphoid fever in the various Divisions:—

Divisions.	Enteric Fever.		Paratyphoid A.	
	Admissions.	Deaths.	Admissions.	Deaths.
1st (Peshawar)	3	1	...	...
2nd (Rawalpindi)	27	7	1	...
3rd (Lahore)	3	1	3	...
4th (Quetta)	3	1	3	...
5th (Mhow)	5	...	9	...
6th (Poona)	18	1	13	1
7th (Meerut)	7	2	8	...
8th (Lucknow)	6	1	35	1
9th (Secunderabad)	12	2	6	...
Burma	...	...	...	...
Aden	1	...	...	...
Marching	...	...	1	...
Total ...	85	16	79	2

It will be seen that the 2nd (Rawalpindi), 6th (Poona) and 9th (Secunderabad) Divisions had the largest number of cases of enteric fever, and that the 8th (Lucknow) Division had nearly half the total cases of paratyphoid fever. Of the cases of enteric fever it was found impossible to trace the source of infection of any of the 13 cases in Rawalpindi—8 of them had been inoculated and of these one died. Eight of the cases occurred in the 21st Lancers which had recently arrived from Egypt, where, last year, the regiment was seriously affected with this disease. In no case could any connexion be traced to a previous one; the cases were distributed throughout the year except in March, April, November and December and no "carrier" was discovered. This was the most serious outbreak of enteric fever that occured in any unit during 1913. There were 11 cases of enteric fever in Poona, all recovered—the same record as for 1912. All had been inoculated. Most careful

investigations were made, special attention being directed to the detection of any "carriers," but the origin of these cases was not ascertained. Connexion between any one case and another could not be traced. All followers had been tested for the Widal reaction before being employed and the sanitary condition of the barracks and annexes was satisfactory. There were 9 cases in Sialkot with 3 deaths; 2 of the 3 fatal cases had not been inoculated, while of the 6 recoveries 5 had been inoculated. The cause of these cases could not be traced and there was no apparent connexion between them. Seven cases occurred in Bangalore with one death, as compared with 9 cases and 2 deaths in 1912; all the 7 cases occurred in separate months, were admitted from different barracks and no "carrier" could be discovered. All had been inoculated against enteric. In Lucknow there were only 4 admissions, all recoveries, as compared with 6 admissions with 3 deaths in 1912. The source of infection could not be discovered in any of the cases,—one of which occurred in January, 2 in July and one in December; they occurred in 4 different units. There were 3 cases in Quetta with 1 death as compared with 1 case in 1912. None of the cases had been inoculated and there was no apparent relation between them. There is nothing of interest to note regarding the 3 cases that occurred at Colaba and the 2 with one death at Cherat. A noteworthy case occurred in Rurki where a gunner died early in 1913, after a very severe infection complicated by several hæmorrhages. This man is recorded as having suffered from three attacks of enteric fever. The first was during the South African War, the second in Quetta in 1907, and the 3rd that from which he died.

From every station in which enteric fever occurred it is reported that the source of infection could not be traced definitely. The difficulty in ascertaining the origin of the disease is becoming greater every year with the progressive decrease in the incidence of the disease. In the year under report practically all cases have occurred sporadically; in stations where a number of cases were admitted they were either from different units or occurred in different months. Medical officers have taken an enormous amount of trouble in their efforts to find out how the disease was acquired, particularly to ascertain if "carriers" existed; especial attention was devoted to followers.

Paratyphoid Fever.—There were 79 admissions with 2 deaths, as compared with 64 cases with 2 deaths in 1912. The increase was due to outbreaks of the disease in Lucknow, Fyzabad and Kamptee, which will be referred to later. There were no cases due to *Bacillus paratyphosus B.* Last year in every case of paratyphoid fever A. the specific organism was isolated by blood culture; this year it was isolated from the blood in 59 out of the 79 cases; in the remainder it was recovered from either the fæces or the urine. Of the 79 cases 78 had been inoculated against enteric, which appears to indicate, as stated last year, that anti-enteric inoculation affords no protection against paratyphoid fever. It may be noted that anti-paratyphoid inoculation with a vaccine prepared in the Royal Army Medical College, has been tried in 110 men of the Leinster Regiment in Fyzabad, distributed over 3 companies. It is too early to make any statement regarding the results.

The stations in which the disease was most prevalent were: Lucknow, 20 cases with one death; Fyzabad, 12; Poona, 7; Ranikhet, 4; Kamptee, 4; Mhow, 4; and Belgaum, 4 with one death.

In the Lucknow cases *B. paratyphosus A.* was isolated from the blood in 18, all in the first week of the disease; in one it was not isolated until the man was sent to the Naini Tal Enteric Convalescent Depôt; in the fatal case (directly due to perforation of the bowel) it was isolated from the blood after death. In no case could the source of infection be traced. In the Fyzabad outbreak the specific organism was isolated from the blood in 10 of the 12 cases, and from the fæces in the other two. Regarding these two it was only persistent examination of the excreta that led to the diagnosis. In the Fyzabad Laboratory 393 examinations of urine and fæces were made before a "carrier" of *B. paratyphosus A.* was found. In Belgaum there were 4 cases in which the specific organism was isolated from the blood. They were considered to have contracted infection from a cook who was found to give a high Widal reaction (1-200). *B. paratyphosus A.* was not isolated from either his urine or fæces though both were examined on several occasions; nevertheless no further case occurred after he was dismissed. There were 4 cases of paratyphoid fever in Kamptee; all occurred in December, the infection having, it is stated, been introduced by the 2nd East Yorkshire Regiment from Fyzabad. At Mhow there were 3 cases and at the Naini Tal Enteric Depôt one of these was found to be a "carrier". The reports show that in every station in which the disease occurred medical officers perseveringly endeavoured to elucidate the origin of each case without success. Evidence is accumulating that the indigenous population suffer from paratyphoid fever to a certain extent and that it is probably more or less endemic in the country. Hence the necessity, which appears to be almost universally appreciated, of examining every follower or servant employed with British troops.

Anti-enteric inoculation.—Anti-enteric inoculation continues to progress satisfactorily; over 93 per cent. of all European troops serving in India at present have been inoculated. In the 5th (Mhow) Division the percentage has reached 97·8, and there are some British Infantry units in which every non-commissioned officer and man has been inoculated. Practically in every garrison all Indian cooks, mess servants and others who have anything to do with handling food are inoculated as a routine measure. In at least two instances, possibly a third, "carriers" of enteric bacilli were discovered and dismissed, thus eliminating possible originators of epidemics of this disease. The table below shows the state of inoculation as returned on the last day of the year:—

Branch of service.	Number of inoculated men who have not had Enteric Fever.		Number of inoculated men who have had Enteric Fever.		Number of non-inoculated men who have not had Enteric Fever.		Number of non-inoculated men who have had Enteric Fever.	
	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.
Cavalry	4,795	4,336	103	122	328	516	59	60
Royal Horse Artillery... ...	1,512	1,757	25	29	116	130	12	22
Royal Field Artillery	5,954	5,998	87	106	427	447	79	122
Royal Garrison Artillery ...	3,307	3,392	27	23	565	600	56	74
Ammunition Column	629	726	7	6	45	79	22	29
Infantry	47,113	46,068	403	536	1,808	2,513	221	378
Attached Troops	372	927	3	11	57	182	7	23
Royal Engineers	39	130	...	...	51	68	4	11
Staff and Departments	1,623	671	27	6	617	639	84	95
Total ...	65,344	64,005	682	839	4,014	5,174	544	814

Of the 85 cases of enteric fever in 1913 the records show that 61 were inoculated and 24 were non-inoculated men. There were 8 deaths among the inoculated and 8 among the non-inoculated. The ratio of admission per 1,000 of inoculated strength for enteric fever was 0·9 and the corresponding ratio of deaths was 0·12. The admission rate was 5·3 per 1,000 of non-inoculated strength and the death rate 1·76. The disparity between the two groups is noteworthy.

Combining enteric and paratyphoid fevers, the admission rate among the inoculated was 2·1 per 1,000 of strength, while among the non-inoculated it was 5·5. The corresponding death rates are ·15 and 1·76.

As the protective influence of primary inoculation is very greatly lessened after two years, re-inoculation is urged after that time and is now progressing steadily.

Some infantry battalions have not had a case of enteric fever for over 2 years, and it has been ascertained that in these units Indian cooks are not employed and inoculation has been adopted by all ranks almost universally.

A review of all the circumstances surrounding enteric fever in our European troops, as it occurs today in India, leads to the conclusion that the progressive decline in the prevalence of the disease is due to the high proportion of men protected from infection by anti-enteric inoculation, the detection of "carriers" in barracks, the elimination of convalescents by sending them to special Enteric Depôts in the Hills, the practice of night-soil incineration, and consistent effort in improving the sanitary condition of barracks and their surroundings.

Enteric convalescent depôts.—Both the Naini Tal and Wellington Enteric Convalescent Depôts continue to carry out invaluable work and form one of the strongest lines of defence against "carriers".

Naini Tal Depôt.—The nature of the cases dealt with in the depôt, as finally determined, is shown in the following table. Similar facts for the preceding year are adduced for comparison :—

Year.	Pyrexia of uncertain origin.	Paratyphoid Fever A.	Paratyphoid Fever B.	Enteric Fever.	Mediterranean Fever.	Total.
1913 ...	103	55	...	41	2	201
1912 ...	83	63	4	89	...	238

Of the two patients shown as cases of Mediterranean fever, one was sent as a convalescent from enteric fever, the other as a convalescent from pyrexia of uncertain origin. Of the 103 cases of pyrexia of uncertain origin the officer in charge is inclined to class 3 as probably enteric fever and 63 as paratyphoid A. In two the pyrexia turned out to be due to appendicitis and in one to kala-azar.

Three carriers were discovered, two of *B. typhosus* and one of *B. paratyphosus A.* It was not necessary to invalid any of these cases. One chronic carrier, a woman, was transferred from Quetta; a long course of typhoid vaccine was administered without benefit. At the end of nine months she was allowed to go to Poona as she had no home in England. Another case may be mentioned. A girl 7 years of age contracted enteric fever at Naini Tal in April 1913. Eberth's bacillus was isolated from her urine on one occasion and after 25 negative examinations she was regarded as "free from infection"; in August she returned to her home in Fyzabad, where, 6 weeks later, a woman in the same quarters and who was often with the child contracted the disease. There was no other case in the station and no likely cause of infection, yet repeated examinations of the child's excreta proved negative.

There were 3,990 examinations of fæces and 3,907 of urine made in the Naini Tal laboratory in 1913 and 201 cultures, sent from practically all parts of India, were examined.

Wellington Depôt :—There were 93 convalescents sent to this depôt in 1913. The following table gives the classification of the cases as finally determined and similar figures for 1912.

Year.	Pyrexia of uncertain origin.	Paratyphoid Fever A.	Paratyphoid Fever B.	Enteric Fever.	Total.
1913	32	15	10	36	93
1912	3	5	...	45	53

All but one of the cases of paratyphoid sent to Wellington were diagnosed by the isolation of the organism from the blood or excreta. The exception was diagnosed on an "incomplete" absorption test, but *B. paratyphosus A.* was isolated from the fæces of this case 29 days after his arrival and $3\frac{1}{2}$ months from the beginning of his illness. In the 32 cases of pyrexia of uncertain origin, sent to Wellington, the specific organism, *B. paratyphosus A.* was found in only one case from whose urine this organism was recovered 3 months after the beginning of his illness. Of the 36 cases diagnosed as enteric fever sent to this Depôt, one proved to be a case of paratyphoid fever A.

One chronic carrier (*B. paratyphosus A.* urine) remained over from 1912, and was invalided to England. Eight intermittent carriers were discovered; 2 of these were ultimately declared free from infection and returned to duty; the other 6, of whom 2 were enteric carriers, remained in the institution at the close of the year. One case of pyrexia of uncertain origin sent from Kirkee was proved to be a *B. paratyphosus A.* carrier.

There were 6,196 examinations of excreta (half of them fæces and half urine) and 192 Widals reactions carried out in 1913 as compared with 3,664 such examinations in 1912. The routine is to subject each case to 30 examinations extending over 3 months; in 1914 it is proposed to carry out 50 examinations in each case, extended over a period of 4 months, in view of the fact that in some cases the discharge of the specific organisms occurs intermittently with long intervals.

The officers in charge of both depôts emphasise the importance of early blood cultures in all cases of pyrexia of uncertain origin, and that should this attempt to isolate a specific organism prove negative, an early and daily examination of the excreta should be conducted.

There was a considerable increase of cases of pyrexia of uncertain origin under observation in both depôts. No cases of paratyphoid fever B. was detected in either. In neither depôt was there a case of typhoid or paratyphoid fever contracted. In both institutions all "carriers" are isolated in separate barracks, have their own latrines and wash-houses, and take their meals separately.

It is difficult to overrate the value of the work carried out in these two institutions in controlling the diagnosis of cases of enteric and paratyphoid and other fevers made in the various Divisions and Brigades, in isolating convalescent carriers, and in guiding the direction of sanitary preventive effort.

Enterica.—This term is employed only as a convenient means of including both enteric and paratyphoid fevers, as it is essential to group these two diseases together if present statistics are to be compared with those recorded anterior to 1910, before which date no differentiation was made between them. Taking the two diseases together there were 164 attacks with 18 deaths in 1913, as compared with 182 attacks with 28 deaths in 1912; this gives an admission rate of 2·3 and a death rate of ·25 per 1,000 of strength for the year under report. The following table gives the ratios for the last 5 years:—

"ENTERICA."

(*Enteric Fever and Paratyphoid Fevers A. and B.*)

Years.	Ratio per 1,000.		Case mortality per cent.
	Admissions.	Deaths.	
1909	8·9	1·58	17·7
1910	4·6	·63	13·7
1911	3·8	·33	8·8
1912	2·6	·39	13·1
1913	2·3	·25	9·84

The next table gives the annual admission rate per 1,000 of strength for "enterica" during the last five years in all stations having an average annual strength of over 500 during 1913.

Admission Ratios for Enterica, 1909-13.

Stations with average annual strength of over 500 during 1913.	1909.	1910.	1911.	1912.	1913.
Peshawar	11·3	7·9	3·0	·6	·6
Nowshera	14·3	6·1	6·4	1·9	...
Rawalpindi	7·2	5·9	·7	2·7	4·6
Gharial	3·7	2·4	...	...	1·4
Barian Camp	6·2	4·8	8·2	11·3	3·4
Sialkot	20·7	15·1	·8	1·9	7·9
Lahore Cantonment	25·9	9·7	4·5	3·8	1·7
Dalhousie	6·9	4·0	...	6·3	1·5
Multan	20·3	2·3	4·4	2·2	1·2
Ferozepore	1·0	1·0	1·0	...	...
Jullundur	20·0	1·6	...	...	...
Ambala	3·0	5·3	...	4·8	...
Dagshai	2·9	1·5	9·9	1·3	...
Meerut	26·0	2·3	1·8	3·2	1·7
Delhi	...	...	...	...	...
Agra	5·5	2·4	...	...	1·1
Bareilly	15·1	...	16·8	1·5	1·4
Ranikhet	9·6	6·0	·5	1·2	2·4
Chakrata...	3·6	1·5	1·6	·9	1·7
Lucknow	23·2	4·2	15·4	5·5	9·3
Fort William	5·8	1·5	·8	4·8	·8
Dinapore	...	...	...	...	...
Lebong	1·5	...	1·6	1·6	...
Allahabad	7·3	...	4·2	...	...
Cawnpore	7·3	...	...	1·0	1·1
Fyzabad	13·7	14·2	11·6	30·6	13·3
Quetta	4·8	2·2	3·5	·3	1·4
Karachi	3·6	3·9	4·4	...	·8
Hyderabad	...	...	1·8	...	...
Mhow	2·8	6·9	2·7	1·1	2·2
Kamptee	19·5	14·4	3·4	1·0	4·2

Admission Ratios for Enterica, 1909-13.

Stations with average annual strength of over 500 during 1913.	1909.	1910.	1911.	1912.	1913.
Nasirabad	7·2	1·1	6·0	4·5	2·5
Jhansi	7·5	13·1	3·2	1·0	2·8
Jubbulpore	11·9	6·6	4·8	2·7	...
Poona	12·4	8·4	3·0	5·3	9·2
Kirkee	26·0	12·0	5·4	·9	2·6
Bombay (Colaba)	·9	2·8	3·9	1·7	2·7
Deolali	...	...	...	...	...
Ahmednagar	9·3	1·7	2·9	1·0	1·8
Belgaum	12·5	8·0	14·0	3·7	5·6
Secunderabad	6·7	3·4	4·5	5·0	1·6
Bangalore	10·9	6·0	4·9	4·6	4·6
Madras	...	1·5	3·0	...	1·3
Wellington	5·6	1·9	4·3	3·4	1·0
Maymyo	...	...	...	...	...
Shwebo	...	...	...	...	...
Rangoon	1·5	·8	·9	...	...
Aden	2·7	2·9	...	3·3	·9

Mediterranean Fever.

4. There were 9 cases of Mediterranean fever in 1913 as compared with one in 1912. Two were admitted to hospital in Lahore Cantonment, where cases were occurring in the bazar; the diagnosis was verified at the Enteric Convalescent Depôt, Naini Tal, but the source of the infection was not traced in either case.

Pyrexia of Uncertain Origin.

5. The group of diseases returned as pyrexia of uncertain origin gave rise to 1,101 admissions in 1913, as compared with 1,506, in 1912. One of the most satisfactory features of the statistics in 1913 is that the number of these cases has fallen so considerably, indicating, as it probably does, a greater discrimination and care in diagnosis.

The largest number of admissions for pyrexia of uncertain origin occurred in Lucknow (258), Cawnpore (59), Rawalpindi (59), Karachi (49), Mhow (39), Lahore (39), Multan (23), Barrackpore (22), Ahmednagar (21), Kirkee (20), Dagshai (18), Poona (27), Fyzabad (17), Nasirabad (16), Kasauli (15), Allahabad (15), Colaba (11), Dinapore and Cherat (12 each) and Lebong (10). In other garrisons the

admissions were under 10. The following table gives the admission rates for pyrexia of uncertain origin and malaria in the various Divisions during the years 1911-13

Divisions.	Admissions per 1,000 of strength.					
	Pyrexia of Uncertain Origin.			Malaria.		
	1911.	1912.	1913.	1911.	1912.	1913.
1st (Peshawar)	54·0	18·0	5·9	196·0	192·4	274·6
2nd (Rawalpindi)	14·2	16·5	16·4	86·7	94·0	288·1
3rd (Lahore)	39·6	33·5	22·4	94·8	80·0	188·9
4th (Quetta)	10·3	9·4	14·0	129·2	103·3	142·8
5th (Mhow)	5·2	4·8	·1	168·5	167·7	133·0
6th (Poona)	20·2	22·4	12·9	95·5	84·9	90·3
7th (Meerut)	9·6	2·8	2·5	75·2	37·8	63·3
8th (Lucknow)	56·3	38·8	46·6	48·0	31·5	48·7
9th (Secunderabad)	13·4	3·1	2·4	48·0	47·7	46·8
Burma	90·2	109·2	12·3	41·8	91·8	118·7
Aden Brigade	35·7	31·4	8·3	34·7	26·0	21·2

There is great disparity of the numbers returned under this heading in different large stations as is shown in the table below :—

Stations.	Strength.	Admissions from Pyrexia of Uncertain Origin.
Peshawar	1,709	6
Nowshera	1,082	1
Meerut	1,289	5
Quetta	3,460	23
Lucknow	2,569	258
Rawalpindi	2,799	59
Cawnpore	932	59
Karachi	1,281	49
Mhow	1,823	39
Lahore Cantonment	1,146	39

These figures represent either deficiencies in diagnostic methods or the presence of unclassified fevers or both. The term is used to include all pyrexial states that cannot be designated in any other way, the duration of the fevers so classified varying from days to months. Under this head are probably embraced undiagnosed enteric, paratyphoid, sandfly and malarial fevers, influenza, gastro-intestinal disturbances, &c. In the reports from stations with the largest number of

undiagnosed fevers many of these causes are recognised. Thus the reporting officer of Lucknow states :—"Of these (258) cases 46 were probably paratyphoid fever, though blood cultures were negative. Of the remainder most were of the seven-day fever type". The Cawnpore report states : "It is safe to say that 50 per cent. were of no consequence. They were cases of ephemeral fever of not more than 48 hours' duration and of low range, caused probably by auto-intoxication due to fatigue, exposure to sun or ptomaine poisons. Possibly 25 per cent. of them were sandfly fever, and the other 25 per cent. dengue". Of the Rawalpindi cases it is stated : "Some may have been sandfly fever with unusual temperature charts ; none resembled malarial fever". Of those at Lahore it is remarked : "It is likely that the majority of these were cases of sandfly fever as they averaged 4 days in hospital."

The reports from some stations indicate that a certain undetermined proportion of the cases now returned as pyrexia of uncertain origin are really cases of malarial infection.

Malaria.

6. Malaria continues to be the dominating cause of inefficiency in European troops in India. It accounted for 8,880 admissions with 9 deaths in 1913, as compared with 5,847 with 12 deaths in 1912. The ratio of admissions per 1,000 of strength was 125·5 in 1913 and 82·4 in 1912. This considerable rise in admissions was mainly due to epidemic malaria in several garrisons in Northern India. The ratios of admission and death by Divisions for the last two years are shown in the following table :—

Divisions.	Ratios per 1,000 of strength.			
	1913.		1912.	
	Admissions.	Deaths.	Admissions.	Deaths.
1st (Peshawar)	276·6	...	192·4	·61
2nd (Rawalpindi)	288·1	·29	94·0	·15
3rd (Lahore)	188·9	·34	80·0	·12
4th (Quetta)	142·8	...	103·3	·19
5th (Mhow)	133·0	...	167·7	·37
6th (Poona)	90·3	...	84·9	·14
7th (Meerut)	63·3	...	37·8	...
8th (Lucknow)	48·7	·23	31·5	·11
9th (Secunderabad)	46·8	·13	47·7	·13
Burma	118·7	·32	91·8	·33
Aden Brigade	21·2	...	26·0	...

There were several severe outbreaks in different stations during the year 1913. In Rawalpindi the ratio per 1,000 rose from 175·5 in 1912 to 564·8. The report shows that of a total of 1,581 cases there were 727 fresh attacks and 854 relapses, 56 being diagnosed as malignant tertian, the rest as benign tertian. It is stated that blood smears were carefully examined in every case and that parasites were found in 496 of the first attacks and in 479 of the relapses. The increased incidence is attributed to the presence in and about the cantonment of a heavily

infected indigenous community, the intermittency of the rains, and the prolongation of hot weather into November. Up to last year malignant tertian was rare in Rawalpindi but in March 1913, No. 94 Company, Royal Garrison Artillery, arrived from Delhi where many of the men had suffered from this form of malaria. In the autumn, larvæ of *A. culicifacies* were found in the fire tanks at the arsenal, the nearest barracks to which are those occupied by the 21st Lancers in which regiment a number of men were attacked by malignant tertian. "It is a fair inference that the fire tanks were the breeding grounds and that the men of No. 94 Company, Royal Garrison Artillery, were the source of the malarial parasites." The 21st Lancers were the first to show malignant tertian, then the Garrison Artillery Company, after which it spread through the station from east to west. Systematic preventive measures were employed ; the station was divided into 12 areas, each of which was placed under a medical officer who had a "mosquito brigade" employed under him. The 21st Lancers and V Battery, Royal Horse Artillery, had mosquito nets, and every endeavour was made to ensure their regular use. Quinine prophylaxis (10 grains twice a week on consecutive days) was carried out. All cases of malaria were admitted to hospital and after their discharge were given quinine for 4 months. All followers were regularly inspected and given prophylactic quinine.

In Peshawar the admission rate was 351·7 per 1,000 as compared with 276·1 in 1912. There was no fatal case. Of the 476 cases, 277 were benign and 134 malignant tertian, the nature of the parasites not being demonstrated in the remainder. The high percentage of malignant tertian cases is remarkable and the reporting medical officer states that the parasites in these cases "were most persistent and resisted the effects of cinchonization." The worst months were October, November and December. The probable explanation of the excessive prevalence was the arrival of the 2nd King's Liverpool Regiment from Lahore Cantonment where the Battalion suffered much from malaria. Anopheline mosquitos are said to invade the barracks in large numbers and the existence of numerous water channels with general water-logging of the soil fosters their breeding. It should be remarked that, high as the malarial incidence in Peshawar was, it was only about half that of the years 1909 and 1910.

In Lahore Cantonment, the admission rate rose from 362·0 to 785·3 per 1,000. It is stated that of the 900 cases recorded 520 were relapses and 380 fresh attacks. The reasons given for the outbreak are :—the presence of a large number of infected men in garrison and in the civil population ; the large proportion of soldiers who had been in the plains for 2 or 3 years without a change to the hills ; an excessive and early rainfall resulting in the waterlogging of a large area of the cantonment, and the existence of brick works (which have been opened during the last two years) within half a mile of the British Infantry barracks, where anophelines are abundant. The cantonment is flat and difficult to drain, the surface soil consisting of an impermeable layer of *kankar* which prevents soakage of rain water. The incidence of malaria depends mainly on the amount of the rainfall ; in years in which it is slight there is little malaria, as in 1911; in years with heavy rainfall the incidence is high.

In Karachi the admission rate for malaria in 1913 was 359·9 and in 1912 only 146·1 per 1,000. Of the 461 cases 396 were benign and 65 malignant tertian, 339 being fresh infections and 122 relapses. Again the chief cause assigned for the excessive prevalence is the comparatively heavy rainfall which was 5·6 inches in

excess of the normal. The unit chiefly affected was the 1st York and Lancaster Regiment which had 267 cases up to the time it left Karachi in November. This battalion occupied the Napier Lines through which a large nullah runs in which a great deal of water lodges in the rains. These and the Somerset Lines occupied by the 94th Battery, Royal Field Artillery, which also suffered severely, are near the City and Sudder Bazar. In Jubbulpore with an average annual strength of 2,267 there were 536 cases as compared with 637 in 1912, representing admission ratios of 236·4 and 285·7, per 1,000 of strength, respectively. There has been a steady decline in the incidence of malaria in the main cantonment since 1908, but the 2nd Cheshire Regiment, which has occupied the Ridge Barracks since February 1911, suffered severely. In 1913, it had 371 admissions, in 1912, 475 and in 1911, 235.

From the reports it is possible to measure in some degree the effect of quinine in cases treated in non-malarial hill stations. Convalescents from malaria sent to these usually get only one relapse and if treated systematically with quinine for 4 months no further relapses occur. Similarly it is shown that in malarious stations in the plains in which curative quinine treatment was persistently carried out relapses were decidedly fewer than in others. In one station the housing of all malarial convalescents after discharge from hospital in a separate barrack was found very successful.

The question of the provision of mosquito nets presents many difficulties. Except in a few places nets are not provided by Government; their purchase and use depending upon the initiative of units. In several reports it is stated that the men of units provided with nets use them only when sleeping outside or in verandahs, but not in the barrack rooms where punkahs are provided. It is desirable that in malarious stations men who have once been infected should be compelled to use mosquito nets during the anopheline season.

In several reports it is stated that the punkah coolies were infected with malaria; in one station (Fort Govindgarh, Amritsar) 84 per cent. of them were so infected. It is desirable that these men should be examined before being entertained, and that they and other followers sleeping in barracks should get the same issue of prophylactic quinine as the troops. In several reports the introduction of electric fans as an anti-malarial measure is advocated as these would eliminate the punkah cooly who is so often a source of infection to British troops.

The first step in any systematic attempt to eradicate malaria is a survey of stations with this object, but there are still comparatively few places in which this has been done. Officers are now being specially trained for malarial work and there should be less difficulty in having these surveys carried out. What can be done in this way is evidenced by the fact that there are instances of stations where formerly malaria was both prevalent and malignant in which it is now so mild as not to call for quinine prophylaxis.

One case of blackwater fever was recorded at Thayetmyo in an old malarial subject, and in a case at Fort Lahore the symptoms and *post-mortem* were highly suggestive of this disease.

Sandfly Fever.

7. The number of admissions for sandfly fever was 2,047, as compared with 2,163 in 1912. The disease occurred in an epidemic form in the stations shown in the following table :—

Stations.	Average annual strength.	Admissions.	Ratios of admissions per 1,000 of strength.	Months of maximum incidence.
Peshawar	1,709	423	247·5	July and August.
Nowshera	1,082	241	222·7	May and August.
Rawalpindi	2,799	285	101·8	May and July.
Lahore Cantonment	1,146	41	35·8	May and July.
Multan	857	72	84·0	October and November.
Ferozepore	1,053	235	223·2	April and August.
Jullundur	591	54	91·4	October and November.
Ambala	2,003	107	53·4	August and September.
Agra	932	159	170·6	October and November.
Cawnpore	932	30	32·2	August and October.
Karachi	1,281	62	48·4	October and November.

Single cases are reported from several stations. The records indicate that the disease occurs practically throughout the country.

Notwithstanding that in typical sandfly fever the symptoms are fairly definite, there must frequently be difficulty in the diagnosis when the disease is prevalent concurrently with epidemic dengue and malaria, and possibly other unrecognised fevers. An inquiry into the clinical history of the disease and its serological relations will be carried out as soon as practicable.

Plague.

8. There were no cases of plague in the European Army in 1913; in 1912, there were 10 cases with 5 deaths.

Cholera.

9. There were 5 admissions for cholera in five garrisons and one death, as compared with 19 and 10 deaths in 1912. All these cases were treated with Rogers' hypertonic saline solution used intravenously. Cholera vibrios were found in the stools in every instance. In the fatal case at Secunderabad the comma bacillus was also found in the gall-bladder. This man had just arrived from England when admitted to hospital, and cholera was not prevalent in the district.

10. There were 14 admissions with one death in 1913, as compared with 17 admissions and 3 deaths in 1912. The cases were distributed between Mhow (2), Jhansi (2), Poona (2), and in Allahabad, Bareilly, Lucknow, Bellary, Jullundur, Lahore Cantonment, Rawalpindi (fatal), Madras and St. Thomas' Mount (1 each). In nearly all these cases the disease was prevalent among the civil population at the time, but in the Lahore case the disease did not prevail in the civil community and the origin of the infection was not traced. The man is reported to have suffered previously from small-pox at the age of 7, and had been re-vaccinated 4 times, the last occasion being in 1907.

Small-pox.

The state of vaccination among British troops is very satisfactory. There were more re-vaccinations than in 1912, but no primary vaccinations. The essential facts as to small-pox and vaccination for the last 5 years are given in the following table :—

Year.	Small-pox.		Number of Primary and Secondary Vaccinations.
	Admissions.	Deaths.	
1909	19	1	12,773
1910	3	...	7,346
1911	1	...	6,726
1912	17	3	8,524
1913	14	1	8,981

11. There were 20 cases of measles without a death, distributed over 9 stations.

Measles.

12. There was no case of scarlet fever among the non-commissioned officers and men in 1913.

Scarlet Fever.

13. There were 746 admissions for dengue as compared with 364 in 1912. The disease occurred epidemically in Ambala (310 cases), Allahabad (36 cases), Lahore Cantonment (41 cases), Dinapore (38 cases), Cawnpore (182 cases), Calcutta (35 cases), Madras and St. Thomas' Mount (29 cases). A smaller number of cases occurred in Bangalore, Rangoon and other stations. As far as the records indicate it would appear that the disease began in Calcutta early in August, spread thence to Dinapore sometime in August, reached Allahabad in September, and Cawnpore, Ambala, and Lahore Cantonment in October and November.

Dengue.

14. There were 2 deaths from rabies during the year, one in Saugor and one in Multan. In the former the patient had no recollection of being bitten or licked by any dog; in the latter the man was bitten by a stray dog that could not be found, and although he went to Kasauli and was subjected to the usual treatment the disease developed about 5 weeks after the bite.

Rabies.

Altogether 68 men were subjected to anti-rabic treatment at the Pasteur Institutes at Kasauli and Coonoor.

15. There were 3 cases of this disease as compared with 5 in 1912. They occurred in Fort William, Barrackpore and Cawnpore. The nature of the disease was in each case only recognised at a very late stage.

Kala-Azar.

16. Cases of what were termed "peripheral neuritis" have occurred among European troops in India from time to time during the last decade and were inquired into without anything definite regarding their etiology resulting. Similar cases have occurred more recently at several stations in Lower Bengal. In particular at Lebong, in 1911 there were 23 cases, in 1912 12 cases, shown as peripheral neuritis, and in 1913 there were 43 cases of the same disease but now returned as beri-beri. In the report for 1911 a reference is made to certain cases which occurred in the 3rd Middlesex Regiment in Calcutta and Lebong as being anomalous and presenting a resemblance to beri-beri. In the report for 1912 it is noted that there were 60 obscure cases of peripheral neuritis recorded in Calcutta and other stations in Bengal, and it was observed that evidence was accumulating to show that they were due to disturbed metabolism. In November 1913, attention had been drawn to an outbreak of a disease resembling beri-beri in the 2nd Royal Lancashire Regiment at Lebong and inquiry elicited that during that year there had been 67 cases returned as peripheral neuritis of which about half had been so slight as not to require admission to hospital.

Beri-beri.

In 1911 cases recorded as peripheral neuritis at Lebong were suspected of being beri-beri and in the summer of 1911 the officer in charge of the Presidency Brigade Laboratory was sent to inquire into them. He found several cases with œdema, alterations of sensation of the feet and legs, and cardiac symptoms. He stated that the incidence of the disease was greatest in the lowest and dampest barrack rooms. He found that the flour and rice were mouldy from long storage in a damp room and that the mutton was of poor quality. He noted that the privates and lance corporals (who probably supplemented their food less than the higher ranks) were exclusively affected. Of 14 cases then investigated 7 were teetotalers, most of the others only drank a pint of beer a day and the beer contained no arsenic. In view of subsequent events there is, however, little doubt that they were genuine cases of beri-beri of varying severity.

In the autumn of 1913, the Officer Commanding the Station Hospital, Lebong, suspected that many of the cases that were being admitted to hospital or treated in barracks as peripheral neuritis were in reality beri-beri, and asked for a committee to inquire into it. Majors E. D. W. Greig, I.M.S., F. Harvey, and J. C. Kennedy, R.A.M.C., and Captain C. J. Davys, I.M.S., were appointed and in their report state that "the patients shown to them were suffering from beri-beri", and that there was "no good reason to attribute the patients' condition to any other cause". They considered that this disease had existed in the garrison at Lebong for some years but that the cases were of a mild type and difficult to recognise.

Their report went on to suggest that the food of the troops at Lebong was wanting to some extent in its natural activating principles and so led to defective metabolism and a lowered state of nutrition. It was noted that the disease was confined to the troops at Lebong, and was not present among the civil population in the neighbourhood. The rations supplied to the troops, especially the meat and vegetables, were described as of poor quality, the diet monotonous, and the cooking inferior.

In the same year another series of cases of "peripheral neuritis" occurred at Barrackpore. There were 19 admissions for this disease—11 of which originated in

that station. Of these only one was severe and it is reported that "the remainder were of a milder type than those that had occurred in the two preceding years". Of these 11 cases, 8 belonged to the detachment of the 2nd King's Own Regiment, 2 to the 7th Battery, Royal Field Artillery, and one to the Supply and Transport Corps. Six of the King's Own Regiment admitted, had occupied the same barrack room between the 14th March and 29th April 1913, and this room had been occupied between the 23rd February and 10th March by two men convalescent from the same disease contracted in the preceding year. Shortly afterwards this room was temporarily occupied by men of the 2nd Black Watch from Calcutta, among whom two cases occurred; further, one of the two occupied the bed cot which had been used by one of the invalids and the other a cot placed in the verandah adjoining and very near by. The 2 cases already mentioned in the 7th Battery, Royal Field Artillery, were preceded by 6 cases in the same unit in 1912 and of this total of 8 cases 6 are noticed as having occurred in men occupying a particular barrack room at one time or another. The Medical Officer states: "These facts appear to be more than a coincidence and lead to the opinion that beri-beri is not a food disease, but due to infection or communicated by insects". No reference is made as to the rations of the men.

To revert to Lebong, the view that the cases returned as peripheral neuritis at that station during the last few years were genuine beri-beri may be accepted. It can hardly be accepted as proven, however, that the rations issued at Lebong were specially deficient in vitamines, and in view of the Barrackpore cases it is possible that some other factors may have been in operation. In Darjeeling the disease was limited to Lebong, and the troops at Jalapahar a mile or two away never suffered from it; there was no apparent difference between the rations the Lebong garrison received and those issued to other soldiers throughout India including Jalapahar. The culinary arrangements at Lebong as described by the Committee were not satisfactory but this hardly explains the successive outbreaks of the disease that have occurred in different infantry units stationed there in recent years.

It appears to be premature to arrive at any definite opinion regarding these outbreaks. Should cases occur again in 1914 further inquiries will be instituted.

Dysentery and Liver Abscess.

17. There has been a slight increase in the incidence of dysentery but a considerable reduction in that of liver abscess. In 1913 there were 382 admissions for dysentery with 8 deaths, as compared with 371 with 11 deaths in 1912, and 560 with 19 deaths in 1911. The number of admissions for liver abscess was 36 with 14 deaths, as contrasted with 47 admissions with 23 deaths in 1912 and 71 cases with 33 deaths in 1911. The following table gives the comparative incidence of these two diseases during the last 5 years:—

Year.	Ratio per 1,000.			
	Dysentery.		Liver abscess.	
	Admissions.	Deaths.	Admissions.	Deaths.
1909	11·2	·25	1·4	·48
1910	7·7	·23	1·0	·48
1911	7·7	·26	1·0	·46
1912	5·2	·15	·7	·32
1913	5·4	·11	·5	·20

Secunderabad (Trimulgherry) maintains its "dysenteric notoriety" and yielded a larger number of cases than any other station; it was credited with 75 admissions all of which are definitely stated to have been amœbic, the diagnosis having in most of the cases been confirmed by the finding of *Entamoeba histolytica* in the stools. This station has also yielded the largest number of cases of abscess of the liver. The essential cause of the prevalence of dysentery could not be ascertained; every probable source of origin was investigated, and a weekly inspection of all cooks, sweepers and followers generally, in the hope of finding "carriers", was made without success. All cases were treated with hydrochloride of emetin (half a grain twice daily) hypodermically, and every case except one recovered completely; the exception, after 5 attacks, was invalided home. In Poona there were 37 cases of dysentery and in Kirkee, 29 with one death, but in neither of these stations is the type reported. "Poona diarrhœa", which is possibly a form of dysentery, has been under special investigation during the year and it is hoped that its etiological relations will be worked out.

The most marked characteristics in connexion with this year's reports on dysentery has been the success following the use of hydrochloride of emetin administered hypodermically in the amœbic type of the disease, and the remarkable reduction in the number of hepatic abscess cases.

The *Nomenclature of Diseases* does not differentiate the type of dysentery from which patients suffer, but in those reports in which the dysenteries are classified there is a total of 100 bacillary and 216 amœbic, while 66 are not differentiated. The proportion of cases of amœbic to bacillary dysentery would therefore appear to be at least two to one.

Abscess of the liver occurred in the following stations: Secunderabad, 5 cases with one death; Barrackpore, 2, both fatal; Karachi, 2 with one death; Poona 2; Kasauli, 2 with 1 death; Dagshai 2; 1 case each occurred in 20 other stations, 9 of these cases proving fatal. On the whole the incidence of abscess of the liver was greater in the stations with the largest number of admissions for dysentery.

Colitis.

18. There has been a considerable decrease in the number of cases of colitis, 392 with 2 deaths as compared with 438 cases with one death in 1912. The general impressions left after going through the records of these cases is that certainly some of them were dysentery, and this inference is supported by the fact that in a few instances colitis was succeeded by tropical abscess of the liver. In several of the reports it is stated that many of the cases resembled mild dysentery, and, in some it is added that "they yielded to emetin". In other reports it is considered that most of the cases are due to "climate and errors in diet". In many stations the records show that these cases occur throughout the year there being no seasonal incidence; in others, however, there is a distinct rise of incidence with that of dysentery.

Ear diseases.

19. There has been a considerable increase in the admissions for ear disease during the year under report—1,426, representing 20·2 per 1,000 of strength as compared with 674 or 9·5 per 1,000 in 1912. This increase is due to a change in practice, all cases of this class of diseases being treated in hospital, whereas in previous years many of them were dealt with as out-patients; 781 of the admissions were for inflammation of the external meatus, 333 for inflammation of the middle ear and 244 for perforation of the membrana tympani.

20. Fifty-eight cases of this disease were recorded in 1913: 18 occurred in Quetta and 7 occurred in Lahore Cantonment; there is evidence that all the latter had been in garrison in Fort Lahore. In no case were the covered parts of the body affected. The Lahore cases were treated with applications of carbon dioxide snow, the majority of them requiring 3 or 4 applications at intervals of 10 days. There were 14 cases of this affection in the Peshawar garrison, all in the 2nd King's Regiment which had recently come from Lahore; *Leishmania tropica* was isolated from two of them.

Oriental sore.

21. There has been a very considerable reduction in the number of cases of these two diseases. There were 35 cases of heat-stroke with 7 deaths, and 15 cases of sun-stroke with 2 deaths, as compared with 138 with 14 deaths, and 61 with one death, respectively, in 1912. The reports indicate that there were many other minor cases admitted suffering from the effects of exposure to the sun but not sufficiently severe to be classed as "sun-stroke".

Heat-stroke and sun-stroke.

A noteworthy series of 16 cases of heat-stroke is recorded in the Peshawar returns. They occurred between the 3rd June and 3rd August. All were clinically typical instances of the direct effects of the sun. In one case the patient's temperature reached 110·7; in a second 110° F; in the other cases temperatures of 105 to 109·4 were reached while that of a fatal case was 108 °F. This was the only death; all the others made complete recoveries. The meteorological conditions were highly favourable to the occurrence of heat-stroke. Another series of 8 cases of sun-stroke of a similar kind with one death was reported from Campbellpore. The clinical symptoms were not of a very severe type: in the one case that ended fatally, the man was found lying in a ditch at 3 P.M. on 3rd August, unconscious and exposed to the sun; he was brought to hospital and died a few minutes after his arrival there, his temperature being 110° F.

In connexion with the subject of sun-stroke a series of experiments was carried out in 1913 to ascertain whether there was any foundation for the belief that a red lining to helmets reduced the temperature of the air between the helmet and the scalp. Three sets of ordinary service helmets were used, lined with red, black and with the ordinary white lining, respectively. These experiments demonstrated that a red lining possesses no special virtue inasmuch as the actinic rays cannot pass through the thickness of the helmet, and that the temperature within a helmet, does not vary with the colour of the lining. The reports on this subject were submitted to Dr. Gilbert Walker, F. R. S., Director General of Observatories in India, who records his opinion that the colour of the lining is immaterial and advocates better ventilation so as to admit of fresh air entering the helmet above the brim.

22. There were 18 cases of poisoning admitted in 1913, with 5 deaths, as compared with 45 cases with 7 deaths in 1912. The admissions included 2 cases of poisoning from bad fish, 6 from poisonous stinging insects, 1 from chloroform inhalation, 1 from a poison not defined, 2 from alcohol, and 1 each from corrosive sublimate, quinine, petroleum, snake bite and centipede and scorpion stings. Of the fatal cases 2 were from chloroform vapour (1 shown as an admission for ischio-rectal abscess) 2 from alcohol and 1 from quinine. The case of quinine poisoning was suicidal and occurred in a non-commissioned officer in Bangalore who was involved in monetary troubles.

Poisoning.

23. It is very satisfactory to find that the gradual diminution of this class of disease in British troops in India which was interrupted last year, has begun again. The incidence of venereal diseases in the various Divisions and the Aden Brigade for the last 5 years is shown in the following table.

Venereal Diseases.

All venereal diseases.

Ratios per 1,000 of strength.

Divisions.	1909.	1910.	1911.	1912.	1913.
Peshawar	34·3	38·5	36·0	51·6	30·1
Rawalpindi	52·4	34·2	33·9	34·2	30·4
Lahore	49·7	53·5	44·0	53·0	47·7
Quetta	56·8	41·8	50·0	39·1	37·2
Mhow	75·0	57·1	45·2	48·5	48·7
Poona	68·1	74·5	72·4	64·1	65·6
Meerut	73·6	63·0	49·2	48·1	43·4
Lucknow	80·7	70·3	63·7	72·7	73·5
Secunderabad	84·1	77·9	70·9	74·7	62·7
Burma	107·9	74·4	82·9	84·0	105·1
Aden	38·4	27·9	44·6	49·8	38·7
For whole of British Troops ...	67·8	58·9	53·1	55·5	52·5

The admissions for all forms of venereal disease numbered 3,717, as compared with 3,943 in 1912, which represents an admission rate of 52·5 per 1,000 of strength, as compared with 55·5 for 1912, a substantial decrease and a minimum record. In comparison with the year 1912, the year under report shows a decrease of 1·5 per 1,000 for syphilis, 1·1 per 1,000 for soft chancre, and ·4 per 1,000 for gonorrhœa. The admission rates for the various forms of venereal disease per 1,000 of strength during the last five years are given in the following table :—

Admissions per 1,000 of strength.

Year.	Syphilis.	Gonorrhœa.	Soft Chancre.	All forms of Venereal Diseases.
1909	16·3	37·7	13·9	67·8
1910	14·5	33·5	10·9	58·9
1911	11·9	31·7	9·5	53·1
1912	11·6	34·0	9·9	55·5
1913	10·1	33·6	8·8	52·5

The 15 garrisons with a strength of not less than 200 men which gave the highest rates of admissions, for all forms of venereal disease during 1913, were :—

Stations.	Average strength.	Admission ratio per 1,000.
Fort William	1,192	195·5
Mandalay	249	164·7
Rangoon	1,024	125·0
Bombay	1,124	110·3
Bellary and Ramandroog	483	109·7
Nasirabad	798	107·8
Dum Dum	341	105·6
Barrackpore	391	102·3
Madras and St. Thomas' Mount	773	88·0
Neemuch	492	85·4
Muttra	401	84·8
Agra	933	77·3
Shwebo	572	71·7
Kirkee	1,159	68·2
Kasauli	458	67·7

The incidence of venereal disease, during the last five years according to the arms of the service, is shown in the following table :—

Year.	Venereal Diseases—Admission Ratio per 1,000.		
	Cavalry.	Artillery.	Infantry.
1909	55·1	69·7	72.9
1910	48·2	58·7	64·3
1911	48·9	53·8	57·3
1912	56·1	52·4	60·7
1913	38·1	46·2	59·1

The treatment of syphilis continues to be carried out by the use of salvarsan administered intravenously in combination with intramuscular injections of mercurial cream. There were two deaths following the use of salvarsan. These are referred to later.

During the year specially equipped bacteriological laboratories have been established exclusively for the observation and treatment of venereal diseases, one for the Northern and the other for the Southern Army. Each is in charge of a medical officer specially qualified to deal with this class of diseases and with the scientific problems connected with them.

Of the causes that have conduced to the reduction of venereal diseases among British troops in India during the last decade may be mentioned increase in temperance and in facilities for recreation, greater keenness for out-door games, education in connexion with venereal diseases, improved methods of treating these diseases and the fostering of *esprit de corps* and of a sound public opinion on the subject and a consequent higher moral tone in units. The efforts of regimental officers in these respects should be acknowledged.

There were no less than ten deaths ascribed to syphilis in 1913 as compared with an annual average of two. One died from gumma of the brain following syphilis contracted in Egypt and treated privately by a Syrian doctor. Another was one of unrecognised gumma of the brain in the case of a man to whom salvarsan was administered ; the case was published in the *Journal of the Royal Army Medical Corps*, November 1913. A third case was also due to gumma of the brain in a man who after completion of a full course of treatment had been struck off the syphilis register. Syphilitic endarteritis was the cause of death in a fourth case. A fifth case at Bellary died after being two months in hospital but it is scarcely correct to attribute the fatal issue to syphilis as the man suffered from old aortic and mitral valvular disease and had a history of alcoholism. Another case succumbed to the effects of an extensive hæmorrhage into the brain involving the crura, pons and medulla oblongata ; yet another died as the result of endarteritis obliterans (syphilitic). In a case at Quetta, death was due to gumma in the neighbourhood of the right lateral ventricle together with basic cerebellar meningitis, and in another, at Poonamallee, death was attributed to acute toxæmia and exhaustion arising from amœbic dysentery which supervened while the patient was in hospital for syphilis. At Rangoon a man died while undergoing a course of salvarsan treatment. He had received 0·6 gramme intravenously on the 14th October ; no untoward symptoms followed but he was kept in hospital as some symptoms persisted, and was again given ·6 gramme salvarsan on 8th November after which he was quite well for 48 hours. On the third morning after this second injection he had a sudden paralytic seizure and collapsed, death following in 72 hours.

Invaliding.

24. There has been a rise in the invaliding rate during the year 1913. The total number of men invalided was 532 as compared with 477 in 1912, the ratio per 1,000 of strength being 7·52 and 6·72, respectively. The chief cause of this increase has been the invaliding of a large number of cases of ear trouble for which 74 were invalided as compared with 44 last year. The increase in the admissions for this class of diseases has already been commented upon. There has also been a considerable increase in the number of men sent home as insane and for disorders of vision.

The following table gives the actual number of cases invalided to England for the more important diseases during the ten years 1904-1913 inclusive.

Table showing the number of cases invalided to England for the more important diseases during the years 1904-1913 with the actual totals.

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
Syphilis	175	75	120	76	59	26	18	10	9	13
Malaria	259	126	136	274	62	76	5	7	3	5
Valvular disease of heart and disordered action of the heart	317	171	222	177	96	71	90	57	61	54
Debility	189	151	255	177	70	20	14	5	13	9
Tubercle of lung	223	116	91	106	72	65	71*	55	47	49
Dysentery	85	37	59	49	31	16	9	9	9	7
Insanes	115	65	64	69	53	50	37	40	28	44
Local injuries	71	51	66	62	80	35	35	39	42	35
Rheumatic fever (including gout, osteo-arthritis, etc.)	44	48	40	30	27	7	4	12	14	17
Enteric fever	93	52	115	86	21	9	4	3	6†	2‡
Diseases of nervous system other than epilepsy and mental	56	43	59	57	44	25	29	23	36	37
Perforation of membrana tympani	45	36	51	51	24	23	11	12	15	25
Diseases of respiratory system	64	24	39	50	30	12	16	15	9	9
Epilepsy	53	38	42	33	36	27	25	30	24	26
Abscess of liver	51	49	67	39	31	17	14	2	5	5
Hepatitis, including cirrhosis	51	14	36	21	23	4	9	4	5	5
Diseases of the eye other than amblyopia and errors of refraction.	40	29	29	29	20	16	14	12	16	20
Diseases of the digestive system other than hepatitis, abscess of liver, cirrhosis of liver, hernia and caries of teeth.	80	51	56	41	24	11	11	14	9	11
Bilharzia hæmatobia	71	23	10	4	2	3	1	1	1	...
Diseases of the ear other than perforation of the membrana tympani.	39	28	38	54	44	26	36	50	29	49
Diseases of the circulatory system other than valvular disease of heart and disordered action of heart and varix.	26	23	32	20	18	2	15	10	4	6
Hernia	43	19	15	9	10	3	2	3	1	3
Myopia, ametropia, hypermetropia, astigmatism, amblyopia and amaurosis.	35	19	23	41	20	10	19	13	6	15
Gonorrhœa	24	8	11	21	15	8	7	4	2	9
Varix	9	5	13	9	6	2	1	5	...	...
Caries of teeth	38	14	38	31	9	3	3	6	...	1
Beri-beri	17	25	60	5	5	3	2	1	...	...
Anæmia	3	8	5	7	5	1	...	1	1	1
All causes	2,506	1,506	1,991	1,766	1,074	648	562	512	474	530

* Including a case in which lung as well as peritoneum were affected.
† Includes 5 from Paratyphoid A.
‡ Both cases are of Paratyphoid A.

The invaliding rate from venereal diseases shows an increase. The following table gives the rates for syphilis and gonorrhœa during the last 5 years; in view of the more efficient treatment now available the increase is difficult to account for but is probably of a temporary nature.

Year.	Syphilis.				Gonorrhœa.			
	Invalids sent Home.		Invalids finally discharged.		Invalids sent Home.		Invalids finally discharged.	
	Actual.	Ratio per 1,000.	Actual.	Ratio per 1,000.	Actual.	Ratio per 1,000.	Actual.	Ratio per 1,000.
1909	26	·36	16	·22	8	·11	4	·06
1910	18	·25	17	·23	7	·10	7	·10
1911	10	·14	11	·15	4	·06	2	·03
1912	9	·13	12	·17	2	·03	2	·03
1913	13	·18	...	...	9	·13	...	...

25. The average strength of officers with British units in 1913 was 2,398.

Officers.

Their general health, although better than in 1912, was not as good as it ought to be, there being 1,309 admissions for all causes as compared with 1,362 in the previous year, giving admission rates of 545·9 and 597·9, respectively. The chief diseases treated and their number were:—malaria 122 cases; sandfly fever 75; dengue 47; pyrexia of uncertain origin 50; dysentery 13; tonsillitis and sore-throat 62; influenza 21; gastritis, colitis and enteritis 73; diarrhœa 42; inflammation of the liver 25; jaundice 30; contusions, sprains and strains 127; dislocations 15; fractures 36; and concussion of the brain (all from riding accidents) 25. There were 5 cases of enteric fever, 3 of paratyphoid fever, 4 of small-pox, 2 of tubercle of the lungs, 2 of abscess of the liver, 3 of sun-stroke and 3 of heat-stroke. The following table contrasts the health of officers with that of non-commissioned officers and men for the last 5 years:—

Year.	Ratio per 1,000 of strength.					
	Admissions.		Invalids sent home.		Deaths in the Command.	
	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.
1909	638·5	716·9	17·86	9·06	9·58	6·25
1910	572·9	576·5	18·60	7·75	7·19	4·66
1911	582·1	524·7	15·78	7·07	8·10	4·89
1912	597·9	547·9	16·24	6·68	4·39	4·62
1913	545·9	580·5	14·18	7·49	2·09	3·26

The incidence of enteric fever among the four groups of officers, non-commissioned officers and men, women, and children in 1913 is shown below:—

Enteric Fever, including Paratyphoid Fever A.

Ratio per 1,000 of strength.

Officers.		Women.		Children.		Non-Commissioned Officers and men.	
Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
3·3	*Nil*	3·9	·97	3·7	·14	2·3	·25

Officers are not as a whole as well protected by inoculation against enteric fever as the rank and file, and they are, when on leave and travelling, more exposed to infection, but on the other hand their average age is greater than that of non-commissioned officers and men.

Five officers died during the year as compared with 10 in 1912; this gives a mortality of 2·09 per 1,000 of strength as compared with 4·39 in 1912 and 8·10 in 1911. The causes of death were:—abscess of the liver, 2, and plague, embolism of pulmonary artery and accidental gunshot wound, 1 each.

Thirteen officers, 2 officers' wives and 1 officer's child underwent anti-rabic treatment during the year.

Thirty-four British officers of European units were invalided in 1913 as compared with 37 in 1912. The causes of invaliding were—debility (4 cases), neurasthenia (3), gastritis (3), concussion of the brain (3), fracture (3), gunshot wound (2), dysentery (2) and 1 each for 14 other diseases.

Women.

26. The average strength of women in 1913 was 4,123. Their general health has been fairly good, but there has been a small increase in the number under treatment, 2,172, as compared with 2,117 in 1912, the ratio of admissions per 1,000 of strength in 1913 being 526·8, while that of 1912 was 510·5. The diseases that caused the greatest number of admissions were: malaria 149, dengue 26, sandfly fever 22, pyrexia of uncertain origin 25, tonsillitis and sore-throat 62, debility 708, anæmia 28, bronchitis 43, indigestion 74, diarrhœa 39 and abortion 125. There were 12 cases of enteric fever with 3 deaths; 4 of paratyphoid fever with 1 death; 6 of measles; 1 of scarlet fever; 11 of small-pox with 2 deaths; 8 of tubercle of the lungs with 1 death and 6 of sprue with 1 death.

It is mentioned in the Quetta report that two pregnant women who suffered from enteric fever both became "carriers" and one of them a chronic "carrier".

The following table gives the admission and death rates for the last 5 years :—

Year.	Ratio per 1,000 of strength.	
	Admissions.	Deaths.
1909	596·7	7·67
1910	504·7	6·28
1911	495·8	7·39
1912	510·5	9·16
1913	526·8	6·31

There were 26 deaths during the year as contrasted with 38 in 1912 and 31 in 1911. The death rate was 6·31 per 1,000 of strength; this is lower than in any previous year except 1910, when it was 6·28. The deaths included 3 from enteric fever, 2 small-pox, 2 dysentery, 2 pneumonia, 2 from sudden death after delivery, and 1 from each of the following—diphtheria, paratyphoid fever, enteritis, malaria, tubercle of lung, carcinoma, convulsions (puerperal), valvular disease of the heart, embolus in heart, broncho-pneumonia, gangrene of lung, sprue, acute yellow atrophy of liver, acute nephritis, and inflammation of the Fallopian tube. Two European soldiers' wives underwent anti-rabic treatment during the year.

There were 61 women invalided in 1913 as compared with 51 in 1912. The chief causes of invaliding were: debility (23), malaria (6), tubercle of lungs (5), anæmia (5), valvular disease of the heart (4), neurasthenia (3), dysentery (2), gastritis (2), and 1 each for 11 other diseases.

The following table shows the comparative incidence among women and men in respect of the 4 chief groups of disease. The figures for 1913 are in favour of the women in all except enteric fever.

Year.	Admission Ratio per 1,000 of strength.							
	Enteric Fever, including Paratyphoid.		Dysentery.		Malarial Fever.		Pyrexia of Uncertain Origin.	
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.
1909 ...	8·9	10·2	11·2	6·9	202·8	69·5	61·3	28·1
1910 ...	4·6	6·5	7·7	5·3	132·0	34·8	37·7	15·0
1911 ...	3·8	6·4	7·7	7·1	90·2	26·1	26·4	8·0
1912 ...	2·6	7·0	5·2	5·8	82·4	22·4	21·2	10·4
1913 ...	2·3	3·9	5·4	3·2	125·5	36·1	15·6	6·1

Children.

27. The average strength of European soldiers' children in 1913 was 7,006. There has been a slight improvement in their health, there being 2,555 admissions from all causes as compared with 2,745 in 1912, which give admission rates of 364·7 and 389·6 per 1,000 of strength, respectively. The death rate has undergone a remarkable reduction, as there were only 140 deaths in 1913, as compared with 236 in 1912, death rates of 19·98 and 33·49 per 1,000 of strength, respectively. The death rate is the lowest on record.

The diseases which caused the greatest number of admissions are—diseases of the digestive system 554 cases, diseases of the respiratory system 369, bronchitis 323, diarrhœa 242, malaria 229 and debility 223. There were 25 cases of enteric fever, 1 of paratyphoid fever A., 4 of small-pox, 34 of dengue, 22 of sandfly fever, 43 of pyrexia of uncertain origin, 194 of measles, 23 of chicken-pox, 21 of diphtheria, 13 of mumps, 3 of scarlet fever and 32 of whooping cough.

The chief features in connexion with the diseases of children are indicated in the following table:—

Year.	Admission ratio per 1,000 of strength.				
	Small-pox.	Measles.	Enteric Fever.	Dysentery.	Respiratory Diseases.
1909	1·0	25·2	5·8	7·4	53·9
1910	*Nil*	12·1	3·3	6·1	41·2
1911	·1	66·6	4·3	5·7	31·9
1912	2·1	19·2	2·0	3·1	49·5
1913	·6	27·7	3·7	2·3	52·7

The causes of death were—enteritis (30 cases), broncho-pneumonia (15), premature birth (14), diarrhœa (12), bronchitis (6), diphtheria (7), dysentery (5), infantile convulsions (5), disorders of dentition (5), pneumonia (4), cerebral meningitis (4), malaria (3), appendicitis (3), debility (2), laryngismus stridulus (2), syncope (2), laryngitis (2), atelectasis (2), gastritis (2), and 1 each from 15 other diseases. The large diminution in the number of deaths was due to a reduction of the number of fatal cases of infantile convulsions, diarrhœa and enteritis.

There were 2 European soldiers' children subjected to anti-rabic treatment.

Eleven children were invalided as compared with 10 in 1912.

SECTION II.

INDIAN ARMY.

(From the Director, Medical Services in India.)

28. The average strength of Indian troops, including those on duty in China and other stations outside India, was 131,512 as compared with 132,232 in 1912. Their health was very satisfactory—the admission and death rates having been the lowest on record.

India.

The table in the margin gives a comparison between the rates of sickness, mortality and invaliding for the years 1913, 1912 and the average of the quinquennial period 1907-1911. The total admissions for 1913 were 69,928, as compared with 72,401 in 1912, representing ratios of 531·7 and 547·5 per thousand of strength, respectively.

Indian troops.	All causes.	Ratio per mille.	
	1907-11	1912	1913
Admissions ..	594·5	547·5	531·7
Constantly sick	21·3	20·1	21·4
Deaths ...	5·72	4·42	4·01
Invalids ...	5·55	4·61	5·32

The total number of deaths in 1913 was 528, representing a death rate of 4·01 per thousand of strength, as contrasted with 585 deaths or 4·42 per thousand in 1912.

In the following table the death rates per thousand among Indian troops since 1880, and those of British troops serving in India during the same period are compared :—

Indian Troops.			British Troops.	Indian Troops.			British Troops.	Indian Troops.			British Troops.
Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.	Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.	Years.	Mortality excluding absent deaths.	Mortality including absent deaths.	Death rate per 1,000.
1880 ...	39·22	41·12	24·85	1891 ...	15·44	19·34	15·89	1902 ...	11·16	15·01	14·68
1881 ...	19·24	22·62	16·86	1892 ...	14·97	18·67	17·07	1903 ...	10·04	16·62	13·05
1882 ...	12·24	14·76	12·07	1893 ...	10·29	12·81	12·61	1904 ...	8·46	12·08	10·83
1883 ...	11·76	14·31	10·88	1894 ...	10·76	13·59	16·07	1905 ...	8·09	9·50	10·05
1884 ...	10·50	12·22	12·56	1895 ...	11·60	15·71	15·26	1906 ...	6·57	8·58	10·43
1885 ...	13·67	16·09	14·55	1896 ...	10·20	12·57	14·84	1907 ...	6·27	8·51	8·18
1886 ...	13·27	19·46	15·18	1897 ...	13·12	14·90	22·93	1908 ...	7·41	8·49	9·78
1887 ...	11·68	18·17	14·29	1898 ...	11·07	13·33	20·05	1909 ...	5·62	6·42	6·25
1888 ...	12·84	16·14	14·84	1899 ...	10·70	14·50	12·75	1910 ...	4·89	7·12	4·66
1889 ...	12·94	16·19	16·60	1900 ...	14·04	18·57	14·62	1911 ...	4·48	6·78	4·89
1890 ...	15·91	18·64	13·84	1901 ...	10·68	13·89	12·38	1912 ...	4·42	5·66	4·62
								1913 ...	4·01	4·55	3·26

It should be noted that the first column for Indian troops in the above table is calculated on present strength, *i.e.*, shows the monthly fluctuations due to men on

furlough. In the case of European troops, the present strength and enrolled strength are practically the same. It is most satisfactory to observe that there has been no interruption in the progressively decreasing death rate during the last four years.

The decrease in the admission rate into hospital was due to diminished prevalence of all diseases except malaria, sandfly fever and pneumonia: the diseases, in which there was a noteworthy fall in the admission rates, were—pyrexia of uncertain origin, dysentery, venereal diseases, enteric fever and cholera. The admission rate would have been considerably lower in comparison with previous years were it not that in most units since 1912 all cases not fit for duty in 24 hours are admitted into hospital; in former years many cases were "detained" for some days and then discharged to duty without appearing in the admission and discharge book. The chief diseases in which there was a reduced mortality were enteric fever, cholera, malaria and plague.

The main causes of sickness were malarial fevers, pyrexia of uncertain origin, diseases of the respiratory system, sandfly fever, diarrhœa, venereal diseases, anæmia and debility, and pneumonia, in order of their relative prevalence. Malaria accounted for 18·9 per cent. and pyrexia of uncertain origin for 6·7 per cent. of the total admissions from all causes; in other words, these two groups were responsible for over 25 per cent. of the admissions during the year.

The chief causes of death were—pneumonia, tubercle of the lungs, enteric fever and malaria, these diseases accounting for 25·2 per cent., 6·1 per cent, 5·7 per cent. and 5·5 per cent., respectively, of the total number of deaths. Pneumonia is always an important factor in the death rate, causing about a quarter of the total deaths, while enteric fever continues to be responsible for an appreciable number of deaths amongst Indian troops.

Malaria, hepatic affections, sandfly fever, dengue and venereal diseases were less prevalent than among European troops. Indian troops, however, showed much greater proneness to pneumonia, tubercle of the lungs, respiratory diseases and dysentery.

The statistics of Indian troops located in stations outside India are given in Table XVI.*

The average strength of troops serving in China was 4,391, their rate of admission to hospital was 324·8 per thousand, and the death rate 2·96 per thousand. These rates are considerably lower than those in India generally. Malaria, respiratory diseases, venereal diseases, pyrexia of uncertain origin and anæmia and debility were the chief causes of sickness in the China stations. There were 13 deaths including 3 from anæmia and debility and 2 each from respiratory diseases, sprue and fracture of the base of the skull.

In the stations of the Aden Brigade (Aden, Khormaksar and Perim) the average strength was 1,024; the admission rate was 374·0 per thousand, and the death rate 0·98; pyrexia of uncertain origin, diarrhœa, dysentery and malaria were the chief causes of sickness. There was only 1 death.

In stations on the Persian Gulf the average strength was 733. The admission rate per thousand of strength was 525 and the death rate 4·09. The more prevalent diseases were dysentery, malaria and pyrexia of uncertain origin. There were 3 deaths, all included in "other causes".

* Standard Table of the Sanitary Commissioner's Annual Report.

The following table supplements the information given in Table XVI* :—

—	Average strength.	Admission rate.	Death rate.
Aden Brigade	1,024	374	·98
Persian Gulf	733	525	4·09
Colombo and Singapore	1,589	300	5·03
Tien-tsin and Hong Kong ...	4,391	325	2·96

Geographical groups.

29. The geographical groups of Assam, Bengal and Orissa, and the Western Coast were the most unhealthy ; malaria, pyrexia of uncertain origin, respiratory diseases and venereal affections were most prevalent in these areas.

Northern and Southern Armies, Divisions.

30. As usual there was a much greater amount of sickness in the Northern than in the Southern Army, the admission rate of the former being 649·0 as compared with 480·0 in the latter. The death rate of the Northern Army was 4·8 and of the Southern Army 3·6 per thousand, the difference being chiefly due to the higher mortality from pneumonia, enteric fever and malaria in the Northern Army.

The highest admission rates were in the Kohat, Derajat and Bannu Brigades, 1st (Peshawar) and 2nd (Rawalpindi) Divisions. The main cause of the mortality in the 1st (Peshawar) and 2nd (Rawalpindi) Divisions was pneumonia.

The lowest death rates were recorded in the Aden Brigade, Burma, and 5th (Mhow) Divisions ; in the Aden Brigade and the 6th (Poona) Division there were reductions in the death rate of 2·50, and 2·06, respectively.

Stations, Regiments.

31. In 1913, there were 40 stations in India with an average strength of over 1,000 ; among these the admission rates were highest in Kohat, Lahore Cantonment and Dera Ismail Khan, and the death rates highest in Sialkot, Dera Ismail Khan and Bareilly. In the former the main causes of the high admission rates were malaria, pyrexia of uncertain origin and dysentery ; in the latter pneumonia caused more deaths than any other disease.

The regiments in which disease was most prevalent during the year were the 72nd Punjabis at Dera Ismail Khan, Tank and Peshawar, the 2/6th Gurkhas at Abbottabad, the 2/10th Gurkhas at Takdah, the 112th Infantry at Nowshera, and the 2/2nd and 2/9th Gurkhas at Dehra Dun. The admission and death rates in these battalions are given in the following table :—

Unit.	Station.	Admission rates.	Death rates.
72nd Punjabis	Dera Ismail Khan ...	1008·6	24·29
2/6th Gurkhas	Abbottabad ...	902·4	20·03
2/10th Gurkhas	Takdah ...	599·3	13·56
112th Infantry	Nowshera ...	533·7	11·24
2/9th Gurkhas	Dehra Dun ...	371·0	11·55
2/2nd Gurkhas	Dehra Dun ...	380·8	10·65

* Standard Table of the Sanitary Commissioner's Annual Report.

The number of men invalided from the service was 699 as compared with 609 in 1912, the chief causes of this loss being tubercle of lung, anæmia and debility, venereal diseases, rheumatism and valvular disease of the heart.

Cholera.

32. Cholera was responsible for 34 admissions with 20 deaths, as compared with 85 and 38, respectively, in 1912. The 37th Lancers, Lahore Cantonment, had 5 admissions with 4 deaths. Three fatal cases occurred in the 81st Pioneers at Camp Nira where the battalion was employed on canal works. The infection was brought into camp by a man from an adjacent village in which the disease was epidemic. There were 3 cases, all recovered, in the 34th Pioneers, Sialkot: a severe epidemic of the disease prevailed in Sialkot City at the time. There were 2 admissions in the 31st Lancers (Kohat), both recovered. Two cases, both fatal, are recorded in the 30th Punjabis, Jhansi. The 11th Rajputs, Dinapore, record 2 cases, 1 fatal; both acquired infection at the Sonepore fair. There were 2 cases in the 2-10th Gurkhas, Takdah; both acquired their infection at a fair in the neighbourhood. Two cases occurred in the 36th Sikhs (Lucknow). In 13 other units there were single cases.

Small-pox.

33. There were 75 admissions from small-pox with 1 death, as compared with 64 and 3, respectively, in 1912. In no unit did the disease attain to the form of an epidemic, the largest number of cases in any one unit being 4; the 75 cases were spread over 34 different stations. There were 4 admissions in the 96th Berar Infantry (Mhow); small-pox prevailed epidemically in the bazars at the time these cases occurred. Three cases occurred in the 79th Carnatic Infantry (Aurangabad); one acquired the infection at his home just before returning from furlough, the second case was a "contact" of the first, and the third was infected in the bazar where the disease was present in an epidemic form. Three cases were recorded in the 99th Infantry (Sehore) and 3 in the 2nd Sappers and Miners (Bangalore). Two cases were admitted in each of 11 units and 1 in each of 40 units. All those who contracted small-pox had been vaccinated or showed signs of having had a previous attack of small-pox. The 1 death occurred in a recruit who bore marks of a previous attack of small-pox.

Malaria.

34. There were 13,199 admissions from malaria with 29 deaths as contrasted with 11,752 cases with 35 deaths in 1912. This represents an admission rate of 100·4 and a death rate of 0·22 per thousand as against 88·9 and 0·26, respectively, in 1912. The increased incidence only affected the Northern Army. In the Southern Army stations there was less malaria than in the previous year.

Malaria was severe in many stations in Northern India (the ratio of increase, however, was lower than that amongst European troops). The cause to which this was attributed was the earlier and excessive rainfall.

The highest admission rates (in stations where the average strength was over 150) occurred in Baroda (634·4), Kohat (516·0), Delhi (498·7), Fort Sandeman (473·4), Maymyo (440·2) and Lahore Cantonment (377·9).

The 33rd Punjabis, Delhi, suffered more than any other unit in India in 1913; they occupied the Daryagunj Lines, long since condemned and which will not again be used, as the new barracks in Imperial Delhi are now almost ready for occupation. There were 524 admissions with 1 death.

The 104th Wellesley Rifles suffered severely from malaria in Baroda; there were 432 admissions, the maximum incidence being in the first and last quarters of the year. Quinine prophylaxis was adopted throughout the year and the whole battalion used mosquito nets. The chief reasons given for this inordinate prevalence is the "close proximity of the barracks to a sluggish river and the presence near the lines, in Baroda territory, of a large and highly infected community".

The 54th Sikhs, which occupied the Chamberlain Lines in Kohat, suffered very severely, not only in regard to the number infected but in the malignancy of the malaria. There were 442 admissions as compared with 77 in 1912 when the battalion occupied the McQueen Lines, Kohat. The diagnosis was verified microscopically in all but 24 cases. The number of cases of benign tertian was 194, quartan 3, malignant tertian 193 and malarial cachexia 1. The large majority of the cases that occurred in the first half of the year were benign whilst most of those in the second half were malignant; a similar remark is made by two medical officers regarding the cases in Peshawar.

There were 420 cases in the 23rd Sikhs, Lahore Cantonment, which included 391 benign tertian, 15 malignant tertian and 14 chronic malaria and represents an admission ratio of 580·9 per 1,000 of strength. Only 2 cases occurred in the first half of the year; 218 cases were admitted in September. There were 338 cases in the 28th Punjabis, Lahore Cantonment. The disease prevailed in a widespread form in Lahore Cantonment during 1913: the special circumstances connected with the epidemic have been referred to under the heading of malaria in the section on European troops.

There were 261 admissions in the 27th Punjabis, Dera Ismail Khan; 204 of these were malignant tertian, 49 benign tertian, 2 quartan and 9 chronic malaria. In Dera Ismail Khan malignant tertian is largely limited to the first and last quarters of the year. The recession of the Indus some time after heavy rain leaves an extensive marsh adjacent to the barracks that breeds myriads of anophelines. Quinine prophylaxis (10 grains twice weekly) was carried out from May to the end of December. Mosquito nets were provided but in the hot weather the men would not use them. In December ten per cent. of the battalion had enlarged spleens. As stated in last year's report, Dera Ismail Khan as a cantonment will eventually give way to Tank situated in a more healthy situation on the other side of the river.

There were 250 cases of malaria in the 1-10th Gurkha Rifles, Maymyo, of which 235 were benign tertian, 19 malignant and 3 malarial cachexia. The wing of this battalion which was doing duty at Myitkyina-tumpangkha, Northern Burma, up to the middle of May, returned badly infected with malaria; there were 58 men in hospital on the date of their arrival in Maymyo, and subsequently from 21 to 34 admissions monthly from June to December inclusive.

Pyrexia of uncertain origin.

35. There were 4,659 admissions for pyrexia of uncertain origin with 18 deaths, the figures for 1912 being 5,831 and 15, respectively. The 35th Sikhs (Rawalpindi) had 182 cases as compared with 1 case in 1912: the medical officer gives no opinion regarding the nature of these cases; both malaria and sandfly fever were prevalent in Rawalpindi during 1913. There were 172 cases in the 27th Punjabis (Dera Ismail Khan). This regiment was

also badly infected with malaria and it is probable that some of these cases were due to this cause. The 10th Lancers (Loralai) had 168 admissions, the fever usually lasting about 3 days. There were 153 cases in the 37th Dogras (Jhelum). The medical officer remarks :—"Undoubtedly most of these were malaria, but as the blood examination was negative they were classed as pyrexia of uncertain origin". There were 130 cases in the 84th Punjabis (Rawalpindi). The medical officer states : "Malaria was diagnosed only when malarial parasites were found in the blood or there was a previous history of malarial infection or the spleen was enlarged. All others, irrespective of temperature movements, were called pyrexia of uncertain origin". This unit only shows 25 admissions for malaria although there was a severe epidemic of malaria in Rawalpindi amongst European troops and a moderately severe one among the civil community; there is thus presumptive evidence that many of these pyrexias of uncertain origin were malaria. There were 121 admissions in the 5th Cavalry, Rawalpindi. The medical officer states that malarial parasites could not be found in the blood, there was no periodicity in the pyrexial phenomena, nor enlargement of the spleen. "Most of the cases were treated with quinine in doses of 15 grains three times a day; the majority did not respond to it". Although malaria was very prevalent in Rawalpindi there were only 26 cases recorded. There were 116 cases in the 87th Punjabis (Jhelum). In this regiment there were only 36 cases of malaria regarding which the medical officer states that malaria was only diagnosed as such when parasites were found in the blood and that "many of the pyrexia of uncertain origin were probably malarial".

Sandfly fever.

36. In 1913, there were 1,909 cases of sandfly fever as against 1,316 in 1912. Whilst the largest number of admissions occurred in the Northern Army, the disease is reported from eight of the twelve geographical groups showing that it is not confined, as was believed to be the case a few years ago, to a few limited districts. No cases were recorded in Burma Coast and Bay Islands, Burma Inland, Assam, and Bengal and Orissa. It is evident that medical officers are becoming more familiar with this particular disease and its clinical history, and that the several published reports of outbreaks of the disease in the Indian Army have greatly assisted in diffusing knowledge regarding it.

The 23rd Pioneers (Ambala) had 240 admissions. The epidemic occurred during the months of September, October and November. The medical officer remarks : "The temperature of these cases was most atypical this year and resembled malaria rather than sandfly fever. The pain in the joints too was not a marked feature. The clinical picture in most cases was that of a mixed infection, although no parasites were found in blood films". There were 191 cases in the 15th Lancers (Jullundur), between July and October, a large number of the cases being admitted with the disease on return from furlough; in 79 cases the duration of the fever was three days; in 40, four days; in 43, five days; in 21, six days, and in 8, seven days.

The 107th Pioneers (Jhansi) had 188 cases (the highest monthly incidence being 43 in October and 118 in November) diagnosed under this heading, in which the average duration of pyrexial phenomena was about $3\frac{1}{2}$ days; some are stated to have resembled "seven day fever" clinically. It was at first limited to the Pathan companies by whom the infection was brought from the Peshawar district by men returning from furlough; 121 of the 188 cases occurred in recruits. In this epidemic it is recorded that a recurrence occurred occasionally and that even three attacks appeared in a few cases. The 47th Sikhs (Jullundur) had 164

admissions. The month of maximum prevalence was October in which there were 93 cases; the disease was in an epidemic form in other units in the station at the same time.

Enteric fever.

37. There were 207 admissions with 30 deaths, as contrasted with 243 admissions with 62 deaths in 1912. The ratio per thousand of strength of admissions was 1·6 for Indian as compared with 2·3 for European troops, and of deaths 0·23 as against 0·25. The higher case mortality in Indian troops (14 per cent. as against 11 in the European Army) is possibly to some extent due to the small amount of inoculation against enteric practised, and probably to the less efficient nursing that can be given in the various outposts and detachments in which the disease occurs. In no station was enteric fever epidemic. The incidence in units has been uniformly distributed and in most there have been only 1,2 or 3 cases. There were 13 cases with 3 deaths in the 28th Punjabis (Lahore Cantonment). In none of these could the source of infection be traced. Eleven were among the Punjabi Mussalman Company; this company was isolated in tents, and the company quarters, etc., were disinfected after which no further cases occurred. Eight cases of 'enterica' occurred in the 1-3rd Gurkhas (Almora), 4 were demonstrated to be enteric fever and 4 paratyphoid fever A. The medical officer states: "Ten other exactly similar cases had to be returned as pyrexia of uncertain origin for want of positive laboratory reports on the bloods sent. In all but one case the symptoms were very slight." The whole regiment had been inoculated against enteric fever. Eight cases were admitted in the 2-6th Gurkhas (Kila Drosh), 5 acquired their infection in Kila Drosh, the other 3 acquired the disease on the march from Drosh to Abbottabad; all recovered. There were 5 cases of enteric and 2 of paratyphoid fever A in the 67th Punjabis (Quetta). The source of infection was considered to be a milk woman whose blood gave a positive Widal reaction to *B typhosus*. There were 5 cases of enteric and 3 of paratyphoid fever in the 54th Sikhs. The 1-5th Gurkhas (Abbottabad) returned 4 cases. The 1-2nd Gurkhas (Dehra Dun) recorded 3 cases of enteric and 1 of paratyphoid fever A, which proved fatal. There were 4 admissions with one death in the 2-2nd Gurkhas (Dehra Dun). There were 4 cases with 1 death in the 116th Mahrattas (Jhansi). The source of infection could not be traced in any of these cases. Three cases with 1 death occurred in the 13th Rajputs (Agra). In one of the cases that recovered benign tertian parasites were found in the blood on the 13th day of the fever. There were 4 cases in the 1-8th Gurkha Rifles (Shillong) and 4 in the 37th Lancers (Lahore Cantonment). In neither of these units could the source of infection be traced. There were 3 cases in the 21st Punjabis (Peshawar), 2 of these acquired infection on manœuvres. There were 4 cases with 1 death in the 34th Pioneers (Sialkot and Ambala). There were 2 cases of enteric and 1 of paratyphoid fever in the 56th Rifles (Kohat). In three instances the milk supply was suspected as being the source of infection.

Anti-Enteric Inoculation.—This protective measure is making fair progress among Indian troops. In units in which enteric threatened to spread, all ranks were inoculated. At the present time there are over 13,000 Indian troops protected including 11 complete infantry battalions; in others more than half the unit has submitted to the process. In a large number of units also, all cooks and persons handling food, and followers have likewise been inoculated.

38. There were 85 admissions for this disease as compared with 398 in 1912, and 2 in 1911. Seventy-nine cases occurred in the Southern Army, chiefly in Burma, especially Rangoon, Cannanore and St. Thomas' Mount, the infection in the latter being acquired by men while on duty in Madras. Forty-two cases are recorded by the 66th Punjabis (Rangoon), 21 by the 86th Carnatic Infantry (St. Thomas' Mount), 4 by the 88th Carnatic Infantry (Cannanore) and 3 by the 61st Pioneers (Bangalore).

Dengue.

39. There were 43 admissions, without any death, as compared with 65 cases with 3 deaths in 1912. The units which had the largest number of cases were:—the 47th Sikhs (Jullundur), 17 admissions; 28th Punjabis (Lahore Cantonment) 7; 34th Sikh Pioneers (Sialkot) 6; 31st Mountain Battery (Kohat) 3; 57th Wilde's Rifles (Ferozepore) 2; 1 case occurred in each of 8 other units. In all but 1 of these units the disease was traced to the use of goats' milk. In 2 units it is stated that no further cases occurred after the boiling of all goats' milk used.

Mediterranean Fever.

40. There were 7 cases of this disease with 6 deaths as compared with 8 fatal cases in 1912. All the admissions in 1913 occurred in the Gurkha Battalions in Dehra Dun. The 2-2nd Gurkhas had 3 fatal cases. There were 2 admissions, both fatal, in the 1-2nd Gurkhas, one very acute with hæmorrhages; *Leishmania donovani* was found in smears obtained by splenic puncture in both. Two cases occurred in the 2-9th Gurkhas; 1 died of a terminal dysentery.

Kala-Azar.

41. There were 29 cases of relapsing fever with 2 deaths as compared with 17 non-fatal cases in 1912. In all cases *Spirochaeta recurrentis* was found in the peripheral blood, and all ran a more or less typical course. There were 9 cases in the 23rd Cavalry (Quetta). The disease is reported to be endemic in the Indian Cavalry lines at Quetta and also in some of the servants' quarters and bungalows in the old cantonment of that station. Seven cases occurred in the 1st Sappers and Miners Detachment and 4 in the 2-6th Gurkhas at Kila Drosh; 2 occurred in the 1st Lancers (Peshawar) and 2 in the 2-10th Gurkhas (Takdah). There were single cases in 5 different units spread over 4 stations in various geographical groups, so that the disease may be said to be widely distributed in India.

Relapsing fever.

42. In the year under record there were only 8 cases of beri-beri with 1 death. Six of these cases occurred in the 83rd Wallajahbad Light Infantry (Secunderabad), and the only epidemiological fact worth recording in connexion with them is that 4 cases occurred in this battalion in 1912 in the same barracks. The symptoms were more or less typical of the dry variety of the disease with motor and sensory paralysis affecting the legs, and cardiac embarrassment. One case occurred in the 80th Carnatic Infantry (Rangoon) and 1 in the 1-8th Gurkhas (Shillong).

Beri-beri.

43. There were 22 cases of plague with 13 deaths, as compared with 28 and 18, respectively, in 1912. In only 1 unit, the 29th Lancers (Poona), did the disease threaten to become epidemic; in that regiment there were 9 cases. The whole unit was inoculated against the disease; a severe and prolonged epidemic existed among the surrounding

Plague.

civil community. In the 36th Poona Horse (Cawnpore) there were 3 cases, and in the 17th Cavalry (Bareilly) 2 cases. In 8 other units there were single admissions, and in all but one the disease prevailed extensively in the neighbouring indigenous population. During the year several entire battalions were inoculated against plague, either because a case or cases occurred in them or their followers, or the disease was severely epidemic in the adjacent civil community.

Scurvy.

44. Scurvy accounted for 57 admissions with 3 deaths as compared with 149 cases with 1 death in 1912. It was mostly of a sporadic character. There were 12 cases in the 18th Infantry (Aden and Dera Ismail Khan), practically all occurred in men who were on out-post duty at Aden where fresh vegetables were difficult to obtain. Five cases occurred in the 15th Ludhiana Sikhs (Loralai). This unit was also largely employed on out-post duty and fresh vegetables were scarce. Three cases were recorded in the 109th Infantry (Secunderabad and Aden), and 3 in the 2nd Sappers and Miners. Two cases occurred in each of 8, and 1 in each of 18 units.

Tubercle of the lungs.

45. Although this disease has undergone gradual reduction during the last ten years, it continues to be one of the dominating causes of mortality and invaliding in the Indian Army. In 1913, it gave rise to 231 admissions with 32 deaths as compared with 262 and 32, respectively, in 1912. The following table gives the admission and death rates of Indian troops as a whole, Gurkhas, and Indian troops excluding Gurkhas, for the past 10 years. It will be observed that Gurkhas show a much greater predisposition to this disease than other Indian troops.

TUBERCLE OF THE LUNGS. RATIO PER 1,000.

Year.	Indian Troops.		Gurkhas.		Indian Troops excluding Gurkhas.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1904	3·9	·51	10·6	2·66	3·2	·28
1905	3·1	·50	6·1	1·58	2·7	·37
1906	2·5	·52	5·2	2·41	2·2	·29
1907	2·5	·33	4·8	1·03	2·3	·24
1908	3·0	·42	5·0	1·43	2·7	·28
1909	2·3	·39	4·0	1·33	2·1	·26
1910	2·4	·19	3·6	·50	2·3	·15
1911	2·1	·21	3·6	·70	1·9	·14
1912	2·0	·24	4·1	·84	1·7	·16
1913	1·8	·24	2·7	·94	1·6	·15

Pneumonia.

46. Pneumonia caused 25 per cent. of the deaths that occurred during 1913, and for many years this disease has been the chief cause of mortality among Indian troops. There were 993 admissions with 133 deaths, giving a ratio of admission of 7·6 per thousand of strength and a death rate of 1·01. In 1912, there were 877 admissions with 110 deaths representing ratios of 6·6 and 0·83, respectively. The units and stations showing the highest incidence, in their order, were—29 cases with 3 deaths in the

Queen's Own Corps of Guides (Mardan), 27 with 1 death in the 2-10th Gurkhas (Takdah), 26 with 3 deaths in the 112th Infantry (Nowshera), 25 with 8 deaths in the 72nd Punjabis (Dera Ismail Khan and Peshawar), 24 with 2 deaths in the 81st Pioneers (Belgaum and Camp Nira on canal work) and 16 with 1 death in the 1-6th Gurkhas (Abbottabad).

The unusual prevalence of pneumonia in stations in which malaria was inordinately severe is noteworthy. This point has been referred to in previous reports.

Dysentery.

47. There was a very satisfactory decrease in the number of cases of dysentery; the total admissions numbered 1,578 with 12 deaths as compared with 2,208 with 13 deaths in 1912. There were 84 cases with 1 death in the 95th Russell's Infantry (Santa Cruz); the cases occurred throughout the year and were attributed to the defective water supply from the Wobori main: bacteriological examination shows the water to contain coliform organisms in ·5 c.c. The battalion now occupying the lines is boiling the water and the incidence of dysentery is decreasing. The 2nd Rajputs located at various outposts in the Persian Gulf had 71 cases, "mostly amœbic". The medical officer considered that the scanty supply of vegetables, indifferent water supply and hard work in the Persian Hinterland in the hottest part of the year, were etiological factors of importance. There were 55 cases with 1 death in the 27th Punjabis (Dera Ismail Khan); the admissions were chiefly at the out-posts, especially Khajuri Kach. There were 48 admissions in the 127th Baluch Infantry (Poona). The water supply from Lake Karaklawasla is suspected of being responsible. This water supply and the prevalance of dysentery and diarrhœa in Poona are at present being thoroughly investigated by the civil authorities. The 5th Cavalry (Rawalpindi) showed 44 admissions. The cases were of the mild bacillary type. Many other units had between 20 and 40 cases.

Colitis.

48. There has been an increase in the admissions for colitis. There were 607 cases, none of which were fatal, as against 556 cases with 4 deaths in 1912. As is the case with European troops, there is little doubt that many of these cases are of the type that used to be called *catarrhal dysentery* a generation ago. It is difficult to explain this change in nomenclature. The personal opinion of the medical officer as to the nature of the disease appears to determine whether it be called dysentery or colitis. Thus in one unit in 1912 there were 30 cases of dysentery and only 1 of colitis; in 1913 in the same corps and at the same station, but with a different medical officer, there were 2 cases of dysentery and 25 of colitis. The records show that, whilst these colitis cases occur throughout the year, there is a noteworthy rise in the incidence when dysentery prevails.

Venereal Diseases.

49. A considerable reduction occurred in the admissions for venereal diseases. There were 1,656 admissions with 4 deaths as compared with 1,907 with 7 deaths in 1912; the admission rate per thousand of strength was 12·6 in 1913 against 14·4 in 1912. The ratio of admissions among European troops in 1913 was 52·5 per thousand of strength.

The units and stations showing the largest number of admissions were:—1-8th Gurkhas (Shillong, with detachments at Dibrugarh, Sadiya and with Tantak Column), 44 cases; 124th Baluch Infantry (North China), 44; the 75th Carnatic

Infantry (Fort William), 37 ; 1-9th Gurkhas (Dehra Dun), 34 ; 117th Mahrattas (Poona), 80th Carnatic Infantry (Rangoon), and 83rd Wallajahbad Light Infantry (Secunderabad), 31 cases each ; 126th Baluchis (Hong Kong), 30 ; 2nd Sappers and Miners (Bangalore), 28 ; 61st Pioneers (Bangalore), 24 ; 64th Pioneers (Secunderabad), 23 ; 8th Rajputs (Hong Kong), 22 ; and 13 Rajputs (Agra) 20.

Of the 4 deaths one was due to syphiloma of the liver, one to gumma of brain, one to syphilitic necrosis of the right superior maxilla and total sloughing of the right eye with a terminal implication of the brain, and the fourth to acute nephritis and hepatitis following the intravenous use of salvarsan in a man of alcoholic habit.

Suicides.

50. There were 17 cases of suicide as compared with 11 in 1912. These include 10 gunshot, two cut-throat, one hanging, two drowning, one by arsenic and one by opium poisoning.

Ankylostomiasis.

51. There were 91 admissions for *Ankylostoma duodenale* infection. An interesting series of observations was carried out by Major A. W. M. Harvey, I.M.S., in the 2-9th Gurkhas, Dehra Dun, in connexion with intestinal worms. It was demonstrated that a large number of men were the hosts of *Ankylostoma duodenale* and other intestinal parasites, as indicated in the following table :—

Disease.	Ankylostomum duodenale	Ascaris lumbricoides.	Tricocephalus dispar.	Negative.	Percentage of hosts.	Percentage of hosts of total examined.
Various fevers	16	8	2	34	43·3	39·56
Other diseases	7	3	0	21	32·26	

It would appear that in a certain percentage of cases, pyrexia was due to some form of intestinal helminthiasis.

There were also 22 cases of ankylostoma infection in the 1/2nd Gurkhas.

Guinea-worm Disease.

52. In 1913 there were 241 admissions for dracontiasis. The units which suffered most were—the 116th Mahrattas, 17 cases ; 110th Mahrattas, 16 ; 103rd Light Infantry, 15 ; 117th Mahrattas, 13 ; 105th Mahrattas, 12 ; 114th Mahrattas, 10 ; 101st Grenadiers, 9 ; 108th Infantry, 8 ; 109th Infantry, 7 ; 128th Pioneers, 6. The homes of all those attacked were in the Deccan, chiefly in the Mahratta country. An interesting case occurred in the 101st Grenadiers ; in this case 12 worms were extracted during the first stay in hospital, and 4 during a subsequent admission ; the man was 137 days in hospital altogether. In most cases infection is acquired by men while on furlough.

Commissioned British Officers.

53. The average strength of British commissioned officers with Indian troops in India during 1913 was 1,814 and among them there were 825 admissions with 6 deaths as compared with an average strength of 1,868, 783 admissions, and 8 deaths in 1912. The chief causes of admission were—malaria, 97 ; pyrexia of uncertain origin, 61 ; sandfly fever, 54 ; and dysentery, 27.

The admission and death rates from enteric fever as compared with British troops and their officers were as follows—British officers attached to Indian troops, admission rate 5·5, death rate 0·55 ; British officers with British troops, admission rate 3·3, death rate *nil* ; British troops, admission rate 2·3, death rate 0·25 (see table in Section on European troops, 1913). The greater prevalence among officers is explained in Section I, report on European troops.

Two British officers of the 36th Sikhs (Lucknow) were admitted for enteric fever. The milk supply to the mess which had been infected by an intermittent "carrier" was considered to be the source of the disease.

The 6 deaths were due to—gunshot wound 2, cerebral hæmorrhage 2, enteric fever 1 and pneumonia 1.

SECTION III.

GENERAL POPULATION.

Meteorology, crops and general conditions.

54. The year opened well. There was some scarcity in the Benares State, the Mirzapur district of the United Provinces, the Ahmednagar district and in the districts of the Bombay Deccan, but elsewhere conditions were satisfactory. The first six weeks of the year were all but rainless: in the latter half of February three cold weather depressions entered India and gave much needed rain over the greater part of northern and central India. The rainfall of the hot weather period—March to May—was either normal or in excess in all the major provinces: in the United Provinces, Rajputana and Central India it was exceptionally heavy.

The south-west monsoon on which so much depends, was on the whole unsatisfactory. The monsoon currents arrived very early in Upper India but were very weak in the United Provinces, Central India and Rajputana. They withdrew very early from the central and northern parts of the country: their abnormal diversion to the dry zone of Guzerat and Sind is worthy of note. The prevalence of drought was reported from several provinces chiefly the United Provinces, the Punjab and Central India. Excepting the south-east of the Peninsula the closing three months of the year were also abnormally dry.

At the close of the year gratuitous relief was being distributed in Merwara, in the Sholapur and Satara districts of Bombay and in the Jalaun, Jhansi, Hamirpur and Banda districts of the United Provinces.

In spite of the adverse conditions referred to above, the wheat crop yielded an outturn 14·7 per cent. above the average of the previous quinquennium. The total yield was estimated at 9,597,000 tons, a figure only 3·3 per cent. lower than that for 1912. The rice outturn was 13·5 per cent. below that of 1912. The deficiency was most marked in Bihar and Orissa where defective rainfall in September and October was responsible. The sugar-cane crop was the highest on record and was estimated at 2,552,000 tons of unrefined sugar which is 20 per cent. above the average of the preceding five years. The spring oilseed crops were not very good. At the close of the year the prospects of the spring crops of 1913 were not very good.

Births and deaths.

55. Below is tabulated the number of births and deaths in each province of British India during 1913:—

Province.	Births.			Total deaths.			Ratio of deaths per 1,000 of population.			Mean death rate during previous five years.		
	Total number.	Ratio per 1,000 of population.	Mean ratio during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.
Delhi	17,801	44·84	...	9,864	6,013	15,877	44·23	35·06	39·99	...	...	...
Bengal	1,529,921	33·75	35·27	72,442	1,259,426	1,331,868	24·91	29·68	29·38	24·08	29·10	28·78
Bihar and Orissa	1,443,789	42·10	39·90	32,896	966,486	999,382	27·47	29·20	29·14	30·28	34·39	34·24
Assam	200,075	33·06	32·09	2,549	164,830	167,379	21·20	27·79	27·66	21·95	27·72	27·61
United Provinces of Agra and Oudh	2,232,999	47·67	40·20	121,453	1,510,240	1,631,693	39·35	34·48	34·84	43·63	40·51	40·72
Punjab	878,241	45·4	42·3	60,549	523,235	583,784	35·65	29·66	30·19	38·91	35·63	35·37
North-West Frontier Province	73,333	36·2	35·0	4,649	45,654	50,303	24·31	24·68	24·65	26·06	26·08	26·03
Central Provinces and Berar	685,557	49·26	51·52	37,948	383,447	421,395	30·00	30·22	30·28	42·63	38·23	38·62
Madras Presidency ...	1,288,618	32·2	32·1	126,409	730,242	856,651	26·2	20·8	21·4	28·9	23·4	24·0
Coorg	4,529	25·88	26·70	475	5,384	5,859	47·59	32·63	33·48	56·75	31·00	33·04
Bombay Presidency ...	684,803	34·96	35·92	104,545	416,994	521,539	32·90	25·41	26·63	37·28	28·14	29·61
Burma { Lower	202,606	31·74	33·47	25,388	124,090	150,478	32·89	22·24	23·58	38·78	24·69	26·46
Burma { Upper	118,790	34·20	35·56	11,602	84,248	95,850	39·26	26·51	27·60	43·79	28·26	29·81
Ajmer-Merwara	21,656	43·19	41·86	Not	available	12,960	Not	available	25·85	Not	available	42·93
British India	9,383,218	39·31	38·3	611,769	6,220,289	6,845,018	31·03	28·52	28·72	34·98	32·55	32·77

The birth rate for British India as a whole rose from 38·95 in 1912 to 39·37 per mille, which is just 1 per mille above the mean ratio of the preceding quinquennium.

Once again the Central Provinces recorded the highest birth rate, 49·26 per mille, followed by the United Provinces 47·67, the Punjab 45·4 and Bihar and Orissa 42·10. All the other major provinces had a birth rate below 40 per mille. Lower Burma with a birth rate of 31·74 per mille and Madras, 32·2 per mille, record the lowest rates.

The death rate fell from 29·71 in 1912 to 28·72 per mille in the year under report. The mean death-rate of the previous five years was 32·77. The death rate for 1913 is the lowest recorded since 1898 when a rate of 27·13 was returned.

Everywhere (excepting Coorg) did the birth rate exceed the death rate. The natural increase of population was most marked in the Central Provinces where the birth rate exceeded the death rate by 18·98 per mille; the excess of births over deaths was least marked in Bengal where the difference was only 4·37 per mille.

The death rate in seven of the eleven major provinces of British India was lower than in 1912. The United Provinces, the Punjab, Assam and the North-West Frontier Province reported enhanced rates as compared with the preceding year. In the two latter the increase was not very considerable, but the United Provinces reported a death rate of 34·84 per mille as compared with 29·91 in 1912 and the Punjab rate increased from 26·63 to 30·19. The most noteworthy fall in the death rate was evidenced in the Central Provinces where the rate was 30·28 per mille as against 42·34 in 1912. The fall in the Bombay death rate from 34·88 per mille in 1912 to 26·63 in the year under report is also most noteworthy.

Pride of place as regards death rate goes to Madras where a rate of 21·4 per mille is evidence of a remarkably healthy year. The North-West Frontier Province which in 1912 had the lowest death rate—23·39 per mille—occupied third place in 1913 with a rate of 24·65, Lower Burma coming second with 23·58.

56. The deaths from the chief causes of mortality are tabulated below:—

Chief diseases.

Province.		Cholera.		Small-pox.		Plague.		Fevers.		Dysentery and Diarrhœa.		Respiratory diseases.		All other causes.	
		Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
Delhi		37	·09	172	·43	199	·50	10,392	26·18	258	·65	3,640	9·17	1,179	2·97
Bengal		78,898	1·74	9,062	·19	984	·02	965,546	21·30	33,195	·73	12,063	·26	232,120	5·12
Bihar and Orissa ...		70,379	2·05	3,935	·11	36,383	1·06	623,556	18·18	25,549	·74	6,141	·17	233,439	6·81
Assam		16,407	2·71	2,794	·46	...	...	87,359	14·43	15,869	2·62	4,300	·71	40,650	6·72
United Provinces of Agra and Oudh.		60,427	1·29	8,156	·17	107,683	2·30	1,118,455	23·88	16,164	·34	21,845	·47	298,963	6·38
Punjab		5,811	·30	38,687	2·00	17,877	·92	331,698	17·15	11,065	·57	44,943	2·32	133,703	6·91
North-West Frontier Province.		175	·08	1,421	·70	82	·04	37,801	18·52	309	·15	1,445	·71	9,070	4·44
Central Provinces and Berar		15,286	1·10	6,416	·46	512	·04	195,534	14·05	34,660	2·49	37,535	2·70	131,452	9·45
Madras Presidency ...		37,730	·9	14,802	·4	5,130	·1	268,024	6·7	65,714	1·6	38,327	1·0	426,927	10·67
Coorg		192	1·10	41	·23	10	·06	4,584	26·20	199	1·14	71	·41	762	4·35
Bombay Presidency ...		5,134	·26	9,833	·50	25,288	1·29	246,319	12·58	34,021	1·74	59,418	3·03	141,526	7·23
Burma {	Lower ...	3,704	·58	1,763	·28	4,065	·64	51,956	8·14	7,258	1·14	5,048	·79	76,684	12·01
	Upper ...	635	·8	1,053	·30	243	·07	31,002	8·93	1,760	·49	2,136	·62	59,085	17·01
Ajmer-Merwara ...		...	...	20	·04	...	...	10,886	21·71	620	1·24	327	·63	1,117	2·23
British India {	1913 ...	294,815	1·24	98,155	·41	198,456	·83	3,983,112	16·71	246,578	1·03	237,229	1·00	1,786,673	7·50
	1912 ...	407,769	1·71	89,357	·37	263,037	1·10	3,936,085	16·49	292,216	1·22	247,736	1·04	1,854,787	7·71

With the exception of small-pox and "fevers", the prevalence of which was very slightly in excess of that in 1912, there was an all round lessened incidence of

disease. To "fevers" is ascribed yet again more than half the total mortality of India; 16·71 per mille was the fever death rate as against 16·49 in 1912.

The decrease in the plague death rate from 1·10 per mille in 1912 to ·83 is satisfactory. More than half the total plague deaths occurred in the United Provinces: in the other provinces 1913 was a comparatively mild plague year.

Cholera, dysentery and diarrhœa were all considerably less prevalent than in the previous year: these diseases were more prevalent in Assam than elsewhere.

Small-pox was three times as prevalent in the Punjab as elsewhere and caused a death rate of 2·00 per mille. The North-West Frontier Province came second with a death rate of ·70. Ajmer-Merwara, where 3,050 deaths were ascribed to small-pox in 1912, reported only 20 deaths from this cause in 1913.

Delhi.

57. Delhi had a birth rate of 44·84 as against 46·03 in 1912. Only three major provinces had higher rates than this. The death rate was 39·99 per mille as against 39·26 in the previous year. April was the month of maximum mortality, September that of least. The infantile mortality rate for males was 283·55 and for females 264·12 per thousand births.

The excess of births over deaths amounted to 4·85 per mille of the total population. In Delhi City the deaths were in excess of the births. The female death rate (44 per mille) was in excess of the male rate, 37·44, the high female rate being ascribed to tuberculosis and diseases attending maternity.

The death rate ascribed to "fever" was 26·18: the large influx of workmen for employment on the new works is said to be partly responsible for this high rate. Small-pox and cholera were both much less prevalent than in 1912; 199 deaths were due to plague; only seven of these occurred in the city and these were all imported.

Many sanitary improvements were introduced in the city during the year. The water supply was improved and extended, the conservancy arrangements were re-organised, the number of incinerators was increased and several new water flush latrines were built. An anti-fly campaign was undertaken with success.

A complete drainage and sewerage scheme for the whole city is being prepared.

Registration of vital statistics in the city is now under the control of the Health Officer.

An extensive malaria survey was completed. Improvement in health conditions of Delhi can confidently be expected as a result of the present activity in matters pertaining to sanitation.

Bengal.

58. There were 70,414 fewer births in Bengal in 1913 than in the previous year: the rate fell from 35·39 to 33·75 per mille which is 1·52 per mille below the mean of the previous five years. There was a falling off in the birth rate both in towns and rural areas. The provincial Sanitary Commissioner attributes the falling rate to the high price of food grains in 1912 and to the general unhealthiness of that year. There was a further rise in prices in the year under report and it will be interesting to see whether this will result in a still further decline of the birth rate. The district birth rates varied between 25·97 per mille in the 24-Parganas and 41·64 in Murshidabad. Dhulian (Murshidabad) had a higher birth rate than any other town, *viz.*, 33·26 per mille, and Tittaghar (24-Parganas), a lower, 4·29. The highest rural birth rate was returned for Tollyganj (24-Parganas), *viz.*, 63·31 per mille.

The provincial death rate fell from 29·77 in 1912 to 29·38 per mille, a figure ·60 per mille above the previous quinquennial average. The decrease in the number of deaths was chiefly under the heads " cholera " and " other causes ". The district death rate varied between 20·44 per mille in Mymensingh and 40·44 in Darjeeling. The average death rate of rural circles—29·68—was considerably higher than that of towns—24·91 per mille. The rural area Nawabganj (24-Parganas) had a death rate of 69·93 per mille. The urban death rate was highest in Ghatal (Midnapore), 44·84, and lowest in Asansole, 4·79.

December was much the most unhealthy month of the year. The deaths occurring in it were more than twice as numerous as in August, the healthiest month.

Infantile mortality showed a slight decrease, the rate per thousand births falling from 212·3 in 1912 to 209·6. The highest rate was in Calcutta—274·9 per mille, the lowest in Noakhali—164·4 per mille.

Registration of vital statistics is defective in the eastern districts. In Rangpur 13·66 per cent. of deaths and 6·71 per cent. of births escaped registration. Endeavours are being made to secure improvement.

Cholera was less prevalent than in the previous year and caused 78,898 deaths as compared with 95,467 in 1912 and 98,946 the average of the five years 1908-12. This year's figure represents a mortality of 1·74 per mille. The disease was widely distributed, only 19 of the 487 registering circles being free from it. In Noakhali, the worst infected district, the cholera death rate was 4·78 per mille. To the consumption of sun-dried fish, which is especially attractive to flies, is attributed a leading rôle in the spread of infection in Noakhali. Cholera was most prevalent in December and April.

Small-pox was slightly more prevalent than in 1912; 58·17 per cent. of the total deaths occurred in the Dacca division. It is said that Muhammadans, who form the great bulk of the population of this division, are strongly opposed to vaccination.

There were only 984 deaths attributed to plague; of this number 852 occurred in Calcutta.

" Fevers " were responsible for a death rate of 21·30 per mille against 21·16 in 1912 and 20·45 for the quinquennium 1908-12; 72 per cent. of the total mortality is ascribed to this cause. In 12 districts the fever death rate exceeded 25 per mille: in five others it exceeded 20 per mille, and, excepting Calcutta, in no district was it less than 10. Dinajpur heads the list with a fever death rate of 30·08 per mille. Rural areas suffered two and-a-half times as severely as did towns, the respective death rates being 22·16 and 8·73 per mille. Quinine distribution is persevered with and is increasing in popularity. The subject of malaria prevention is engaging the earnest attention of the provincial Malaria Committee. In this connection research work of some importance has been carried out during the year.

City of Calcutta.

59. Abnormally heavy rainfall was experienced in 1913 and as a result the maximum temperatures were markedly lower and the minimum higher than in 1912.

The death rate rose from 28·1 in 1912 to 29·2 per mille (29 is the mean rate for the previous five years). The increase was accounted for by the greater prevalence of dysentery and diarrhœa, respiratory disease, tuberculosis and measles.

The female death rate was 39·4 per thousand as compared with 24·3 amongst males; in six wards it was over 40 per thousand. This excessive female mortality is stigmatised by the Health Officer as a "terrible indictment of the purdah system". As usual the months of lowest mortality were the monsoon months, June—September.

The infantile mortality rate was 274 per thousand births as against 259·6 in 1912. It varied in the different wards of the city between 214 and 416 per thousand. The birth rate was 20·5 per thousand as against 21·6 in 1912.

The plague outbreak was extremely mild and claimed only 852 victims—fewer than in any previous plague year. Cholera caused 1,764 deaths, the lowest figure recorded during the last ten years; 1,420 deaths were ascribed to malaria as against 1,218 in 1912. There were 350 deaths from enteric fever. The increase in the number of deaths from tuberculosis from 1,931 in 1912 to 2,196 (2·5 per mille) in the year under report is one of the worst features of the health returns. Though females form only 33 per cent. of the total population, 45 per cent. of the deaths from phthisis occurred among them.

60. During the year 6,583 European and 18,737 Asiatic seamen were inspected on inward bound vessels, and 13,172 Europeans and 45,830 Asiatics on outward bound vessels.

Port of Calcutta.

Amongst European seamen the hospital admission rate was 29·91 against 27·21 per mille in 1912: the death rate was only 5·73 per mille. The death rate amongst Asiatic seamen was 6·65 per mille. There were three cases of cholera and three of small-pox removed from sea-going vessels; all necessary precautions were taken. No case of jigger or sleeping sickness was detected on any steamer arriving from East African ports.

61. Fairly normal meteorological conditions, with an average agricultural outturn, were reported from Assam in 1913.

Assam.

The birth rate rose from 32·16 in 1912 to 33·06, the mean of the previous quinquennium being 32·09. It was higher in rural circles (33·17) than in towns (27·50). The district birth rates varied between 29·23 in Lakhimpur and 40·17 in Goalpara. The highest town birth rate was reported for Barpeta (48·70). In rural circles the rate varied between 13·28 (Doomdooma) and 67·80 (Guma). There were 107 male for every hundred female births.

The provincial death rate rose from 25·04 per mille in 1912 to 27·66, the mean of the previous five years being 27·61. The death rate was higher in rural circles (27·79) than in towns (21·20). The district death rates varied between 20·90 in Sibsagar and 33·80 in Goalpara. Nowgong had the highest urban death rate (31·84) and Hailakandi the lowest (5·47). From the point of view of mortality October was the most unhealthy month and February the healthiest. In twelve municipalities vital statistics were verified by house-to-house visitation. The average defect in the registration of births was 14·66 per cent. varying between *nil* in Dibrugarh and 41·45 per cent. in Jorhat. The average percentage of deaths unrecorded was 6·92, the figures varying between *nil* in Dibrugarh and 19·13 in Jorhat. The figures reveal an unsatisfactory state of affairs. The matter is receiving some of the attention it deserves and proposals are on foot for conducting

registration in urban areas through the agency of sub-assistant surgeons, an innovation that should be productive of much good. In rural areas 95,203 births and deaths were inquired into by the vaccination inspecting staff; 4·7 per cent. of these occurrences had not been registered. It is suggested that in the areas of defective registration the number of *chaukidars* or *gaonburas*, the registration agency, was insufficient. In certain of the hill tracts the illiteracy of the village headmen makes accurate registration of vital statistics impossible at present.

The birth and death rates on tea estates were2 6·66 and 25·47 per mille, respectively.

The provincial infantile death rate was for males 210·60 and for females 191·17 per thousand births.

Cholera was responsible for a death rate of 2·71 per mille, the district rates ranging from ·31 in Lakhimpur to 4·21 in Kamrup. A five-years' scheme for the improvement of rural water-supply for Sylhet, the second worst cholera infected district, is under preparation.

From tea estates 1,324 deaths from cholera (1·88 per mille) were reported.

Small-pox was responsible for a death rate of ·46 which is also the average rate for the previous decade.

More than half the total deaths were ascribed to "fever" (14·43 per mille). No anti-malarial work of any magnitude was undertaken. A special malarial officer is to be appointed to Assam and it is probable that anti-malarial measures will be much in evidence during the course of the next few years. Epidemic malaria apparently never occurs but the endemic prevalence is maintained at a high level. Malaria is stated to be the commonest cause of inefficiency on tea estates and the need for more exact knowledge of the mosquitoes responsible is a very real one. Of towns Nowgong had the highest fever death rate (17·85 per mille). In Goalpara the rural circle fever death rate varied between 26 and 68 per mille.

There were 1,798 deaths ascribed to kala-azar (1,875 in 1912). This disease is receiving much attention in Assam. Six travelling dispensaries tour through the endemic areas: one of their duties is to keep the Sanitary Department informed of the progress of the disease. Proposals for the limitation and control of migration of persons living in infected villages is under consideration. In certain villages of the Golaghat sub-division attempts have been made to eradicate the disease by the removal of infected families to fresh sites. Out of forty infected families removed to new sites three years ago, only one person appears to have contracted the disease. The people are said to appreciate these measures of control. Research work on the etiology and epidemiology of kala-azar in Assam is still being prosecuted under the auspices of the Indian Research Fund Association and reports of results hitherto obtained have appeared in the *Indian Journal of Medical Research*.

Dysentery and diarrhœa caused a death rate of 2·62 per mille. *Fasciolopsis buski* was responsible for an outbreak of dysentery in a village in Kamrup.

There was no case of plague.

Bihar and Orissa.

62. Generally speaking, the rainfall was in excess of the normal in Bihar and in defect in Orissa. The agricultural outturn was fair, and the price of food grains did not differ materially from the prices current in 1912. The year was a very healthy one.

The provincial birth rate was 42·10 per mille as against 42·52 in 1912 and 39·90, the mean of the previous quinquennium. Only three of the major provinces in India returned a higher rate than this. The district birth rate varied between 48·16 in Palamau and 34·65 in Manbhum. The average urban birth rate was 31·69 per mille. In the Monaharpur rural circle in Singbhum the very high birth rate of 93·79 per mille was recorded. The excess of births over deaths was 12·96 per mille.

The provincial death rate fell from 31·01 in 1912 to 29·14 in the year under report, the mean rate for the previous five years being 34·24. The 1913 death rate is the lowest recorded during the last fourteen years. The highest district death rate was reported from Saran (34·97) and the lowest from Singbhum (19·94). Towns had a lower death rate (27·47) than had rural circles (29·20), 1 71·75 children per thousand births died during the first year of life.

From the point of view of mortality, February was the healthiest month, July the most unhealthy.

In municipal areas in which registration of vital occurrences is compulsory, 14,897 births and deaths were inquired into with the result that 875 omissions to register were detected (5·8 per cent). In rural areas out of 45,395 occurrences only 93 (·2 per cent.) are stated to have been unregistered. Several schemes, having for their object improvement in registration of vital statistics, are now under consideration, and the local sanitary authorities are very fully alive to the importance of the subject.

All diseases appear to have had a lessened death rate compared with the average of the previous decade. In urban areas the fall was most marked under plague and "fevers"; in rural areas under "fevers".

Cholera mortality fell from 2·24 in 1912 to 2·05. The most serious outbreak was in the Champaran district (6·04 per mille): the part of the district which borders Nepal was chiefly affected. The town of Puri which is so important a pilgrim centre, had a cholera death rate of 7·34 per mille. Amongst anti-cholera measures, permanganating the wells is a measure which is growing in popularity, and there appears to be a commendable increase in the energy with which certain districts deal with outbreaks of the disease. Efforts are being made to determine the importance of the role played by cholera convalescents in the spread of infection: the subsequent movements of patients discharged from the Puri cholera hospitals are being watched. The number of such cases is too small as yet to form any conclusions.

Small-pox was responsible for a death rate of ·11. In no district was the rate as high as ·5 per mille. Among towns Bhagalpur had the highest small-pox death rate (·82). In 29 of the 55 towns in which vaccination is compulsory no death from small-pox was recorded.

Deaths from fevers amounted to 18·18 per mille. In the Purnea district the fever death rate was 25·51. The issue of quinine and the delivery of simple lectures on malaria were among the anti-malaria measures adopted.

Plague was less prevalent than in the previous year and had a death rate of 1·06. As usual Saran was the worst infected district: here the plague death rate was

4·28. In the province 11,538 persons were inoculated against plague. Bhagalpur appears to be the only district in which inoculation is looked upon with anything like favour by the people. Travelling dispensaries are being employed in Saran and Shahabad, the two worst plague infected districts, and are said to be doing good work and to be appreciated by the people.

Kala-azar is prevalent in Saran and Darbhanga though not in anything like epidemic form. Sporadic cases were reported from most districts. Nowhere does this disease appear to be endemic.

Two first and eight second class health officers were appointed to municipalities during the year. The only municipalities of importance that do not yet possess health officers are Puri and Deoghar. These two appointments are kept pending the consideration of the Pilgrim Committee's report. A training school for sanitary inspectors was opened at Bankipore: the course of instruction lasts one year. Twenty candidates were admitted to the first course.

A local sanitary conference and a conference on school hygiene were held during the year.

United Provinces

63. The provincial birth rate rose from 45·38 in 1912 to 47·67 per mille, the second highest provincial birth rate recorded in 1913. The mean rate of the previous quinquennium was 40·20. This rate, 47·67, is the highest recorded in the United Provinces since 1899. The district rate varied between 28·19 in Dehra Dun and 58·21 in Bijnor. There were 108 male to every 100 female births.

The death rate rose from 29·91 in 1912 to 34·84 which was the highest provincial rate in 1913. The urban death rate was 39·35 whilst that of rural circles was 34·48. The district rates varied between 49·24 (Meerut) and 23·25 (Dehra Dun). Of towns Kosi in the Muttra district reported the highest death rate (85·28) and Allahabad the lowest (17·41). From the point of view of the death rate, April and May were the most unhealthy months and October the healthiest. From this fact alone one would be inclined to deduce that plague was largely responsible for the high provincial rate in 1913: we are told, however, that in the year under report fever was chiefly responsible for this April and May excess mortality.

The birth rate exceeded the death rate by 12·83. Except in Muzaffarnagar and Meerut (where the death rate exceeded the birth rate by 7·7 and 4·6, respectively) this excess was general throughout the province. In 22 municipalities out of 86 the death rate exceeded the birth rate. The ten districts with the highest death rate are all situated in the western half of the United Provinces, and "fevers" were responsible for the high mortality therein.

The infantile mortality rate was 229·4 per thousand births and in this respect the United Provinces comes second only to the Central Provinces. High as this figure is, it is well below the decennial average 255. The increase in infantile mortality was proportionately less than that of the general population. Measures taken to combat this excessive wastage of infant life included an increase in the

number of travelling dispensaries to 74, the training of *dhais* (1,292 were admitted for training) in the essentials of midwifery and care of children, the distribution of leaflets and posters dealing with the latter subject, and attention to the milk supply of some of the larger towns. In 1913 the infantile mortality was higher in towns (271·19) than in rural tracts (227·12).

Deputy Sanitary Commissioners inquired into 41,445 births and deaths and found that only ·7 per cent. had escaped registration. Of 605,435 birth and death entries verified by local authorities 3 per cent. of the births and 2 per cent. of deaths had escaped registration and of 780,013 entries tested by the vaccination staff ·37 per cent. of births and ·21 per cent. of deaths were unregistered.

Cholera caused 60,427 deaths, 1·29 per mille as against ·40 in 1912. May, June and July were the months in which the disease was most prevalent. Bahraich (3·96 per mille), Gorakhpur (3·90), Gonda (3·17) and Rai Bareli (3·07) were the worst infected districts. The urban and rural mortality from cholera was 1·38 and 1·28 per mille, respectively. A new scheme for dealing promptly with outbreaks of cholera in rural areas was brought into force and will be in working order before the next cholera season.

There were 8,156 deaths from small-pox (·17 per mille) ; 2,936 of these deaths occurred among infants. The Jhansi and Hamirpur districts, had the highest small-pox death rates, 1·27 and 1·16, respectively. Only one district (Sitapur) was quite free from the disease but in four others deaths from it did not exceed 10.

The provincial plague death rate was 2·30 per mille as compared with 2·45 in 1912 and 2·83 the quinquennial average. As usual March was the month of maximum and September the month of minimum prevalence. Four districts (Almora, Dehra Dun, Garhwal and Hamirpur) were free from the disease. Once again Ballia returns a higher plague death rate than any other district (14·76 per mille) followed by the adjacent district of Ghazipur with 10·58. Banda, a Bundelkhand district that hitherto has been practically plague-free, reported 70 deaths from the disease. 84,109 anti-plague inoculations were performed ; about half the number were done through the agency of travelling dispensaries. The provision of facilities for evacuation of infected houses, inoculation, and travelling dispensaries are the measures adopted to combat the disease.

"*Fevers*," were responsible for a death rate of 23·88 per mille as compared with 20·66 in 1912 and 29·58 the quinquennial average. The maximum fever mortality occurred in May (114,277 deaths) and the minimum in October (78,520 deaths). This is almost a reversal of the state of things one would expect if any very large proportion of fever deaths were due to malaria. The subject is being investigated in Lucknow. Meerut had a higher fever death rate (41·78) than any other district, Muzaffarnagar coming second with 41·55. Ballia had the lowest rate (14·09). The four worst infected districts all border on the Punjab.

Amongst anti-malarial measures, permanent works are being carried out at Saharanpur, Nagina and Kosi with grants made by the Government of India. School quininisation was extended to 17 districts. Lectures and practical lantern slide demonstrations on malaria were given at normal schools and training colleges. Malarial surveys were undertaken in Lucknow City and the Azamgarh district ;

short inquiries into outbreaks of fever at Bhim Tal and Muzaffarnagar were carried out.

Sixteen malaria travelling dispensaries travelled the province. The sale and distribution of quinine were pushed.

A recent report suggests the probability that the fever known as *jhar* in the Naini Tal district is typhus fever.

Relapsing fever was prevalent in Muttra, Meerut and Muzaffarnagar.

The Pilgrim Committee visited most of the important places of pilgrimage in the province and their report will be issued shortly. Final orders as to the new service of sanitary inspectors have been issued. All towns with an income of Rs. 20,000 and over are required to maintain trained inspectors. Arrangements have been made for their training at King George's Medical College at Lucknow. Village sanitary *panchayats* have been established in certain selected districts as an experimental measure; the experiment has not hitherto been attended with any large measure of success.

64. Abnormally dry weather during January and February, an early monsoon which withdrew earlier than usual and comparatively plentiful rain in December are the meteorological features that characterised 1913 in the Punjab.

Punjab.

Of food-stuffs, wheat and gram were at a higher price than in 1912; barley, jowar, bajra and maize were cheaper.

The year was a healthy one.

The provincial birth rate was 45·4 per mille as compared with 45·3 in 1912 and 42·3 the quinquennial average. The district birth rate varied between 53·5 (Rohtak) and 21·9 (Simla). Dera Ghazi Khan (28·6) was the only district that had a birth rate below its quinquennial average. The Central Provinces and the United Provinces alone among the major provinces of India returned a higher birth rate in 1913 than did the Punjab. The average birth rate of towns was 44·5, Amritsar having the highest (46). There were 109·7 male for every hundred female births. The excess of births over deaths for the whole province amounted to 15·2 per mille. The excess was 26·0 in the Lyallpur district.

The provincial death rate rose from 26·6 per mille in 1912 to 30·2 in the year under report. The latter figure is still well below the quinquennial average, 35·4. As stated in last year's report, the 1912 rate was the lowest recorded since 1886. The district death rates ranged between 44·8 (Karnal) and 18·3 (Montgomery). The urban death rate (35·65) was in excess of that of rural circles (29·66).

The female death rate (32·0) was in excess of the male (28·7). Judged from mortality rates alone November was the most unhealthy month, July the healthiest.

Infant mortality per thousand births was 217·61 for males and 216·13 for females, as compared with 195·10 and 194·57 in 1912. More than half the total infant deaths were ascribed to "fevers".

In birth and death registers 1,329,566 entries were checked by divisional inspectors and the revenue and vaccination staffs: as a result it was found that 1·2 per cent. of the births and ·6 of the deaths had escaped registration, from which

it appears that death registration is appreciably more accurate than birth registration.

Cholera was more prevalent than in 1912 and caused 5,811 deaths, ·30 per mille. Lahore district, where there were 3,227 deaths, suffered most. The town of Sialkot reported 681 deaths. The month of maximum cholera intensity was August when approximately half the total deaths occurred. In most years July is the month of maximum incidence. The province was quite free from cholera for the first three and-a-half months of the year: the source of infection was not traceable.

The difficulties encountered in suppressing cholera outbreaks in towns were exemplified in Sialkot where ignorance and resentment of interference were extremely difficult to overcome. Such difficulties were much less in evidence in villages, where the chief obstacle is neglect in reporting the first appearance of the disease.

Small-pox was responsible for a death rate of 2·00 per mille as compared with 1·57 in 1912 and ·72 the quenquennial average. This disease was more prevalent than in any year since 1896. The epidemic attained its height in February. May is usually the month of maximum intensity in the Punjab. The death rate was 2·04 per mille in rural circles, 1·59 in towns. It was greatest among infants under one year of age.

Plague caused 17,904 deaths, a very much smaller number than has been reported for any other year during the last decade. There were in addition 2,327 plague deaths reported from the Punjab Native States. April and May were the months of maximum incidence in which months considerably more than half the total number of deaths occurred. Anti-plague measures consisted in educating the people in simple sanitary measures by lectures, pamphlets and lantern slide demonstrations, rat destruction by trapping, poisoning and smoking—this last measure was attended with considerable success—and inoculation. Inoculation is still anything but popular: 26,419 inoculations were performed during the year. Evacuation of their villages in times of epidemic is a measure in which the people have a thorough belief. The attitude of the people towards the plague staff was described as being most cordial.

"Fevers" accounted for 331,698 deaths (17·15 per mille), considerably more than half the total deaths. There was no severe epidemic of malaria: more fever deaths occurred in November than in any other month. Karnal and Ambala had higher fever death rates than any other districts. These districts adjoin the districts of the United Provinces where fevers were most prevalent in 1913. The urban and rural death rates from fevers were 15·48 and 17·31, respectively. The highest mortality as usual was recorded amongst infants during the first year of life.

The year 1913 was one of special sanitary activity in the Punjab. An additional Deputy Sanitary Commissioner has been appointed. The seven most important towns have been provided with health officers and properly qualified sanitary inspectors are to be entertained by all the more important municipalities. A provincial Sanitary Conference was held to consider how far the resolutions of the previous All-India Sanitary Conference were applicable to the Punjab and how far they could be given effect to.

65. The year was one of good rainfall but the price of food stuffs was slightly in excess of that of the previous year. The birth rate fell from 37·1 in 1912 to 36·2 per mille, a rate which is still above the mean of the previous quinquennium (35). Of districts Peshawar returned the lowest rate (33·8) and Dera Ismail Khan the highest (39·8). There were 126·5 male births reported for every 100 female births, a probable indication of considerable defects in the registration of vital statistics in this province.

The North-West Frontier Province.

The death rate increased from 23·4 in 1912 to 24·7 per mille as compared with 26·0, the quinquennial average. Madras and Lower Burma alone of the provinces of India had lower death rates than this province in the year under report. Of districts Hazara had the highest rate (28·2), Peshawar the lowest (21·5). The death rate in rural circles (24·68) was slightly in excess of that of towns (24·31). From the point of view of mortality November was the most unhealthy month when the total deaths were but little short of double those that occurred in July, the healthiest month.

Out of the total of 50,303 deaths recorded, no less than 22,500 occurred during the first five years of life.

The infant mortality rate was 175 per thousand births.

The Chief Medical Officer of this province is of opinion that the birth and death returns are unreliable in the extreme.

There was no serious outbreak of cholera in the province there being only 175 deaths reported, of which 143 occurred in the Peshawar district.

There were 1,421 deaths from small-pox.

"Fevers" were responsible for three-quarters of the total mortality exacting a death rate of 18·5 per mille; 325 lbs. of quinine were distributed gratuitously in addition to the large amount dispensed from hospitals.

There were twenty deaths from plague in Peshawar City, the outbreak was dealt with with commendable energy and quickly stamped out. Infection was attributed to the importation of rags from the Punjab. Sixty-two cases of pneumonic plague with sixty one deaths occurred in the neighbourhood of Abbottabad.

A small sanitary service consisting of a Deputy Sanitary Commissioner and six health officers was inaugurated during the year.

66. Early cessation of the monsoon rains caused some damage to the rice crops, and for a time considerable anxiety as to the *rabi* crops. The latter was relieved by timely rain in December. On the whole the outturn of crops was good, and in only very few districts were the prices high. The year was a very healthy one.

Central Provinces and Berar.

The provincial birth rate rose from 48·24 in 1912 to 49·26 per mille in the year under report. It is still below the mean rate of the previous five years (51·52), but is considerably higher than the rate returned by any other province. The highest district rate was 55·31 (Murwara) and the lowest 43·23 (Mandla). The rate for rural circles was 49·75 and for towns 44·26. There were 104·79 male births to every 100 female.

The extraordinary fall in the death rate from 42·34 in 1912 to 30·28 (quinquennial average 38·62) is most striking. The diminished mortality was universal.

The district death rates varied between 40·57 (Damoh) and 24·30 (Chhindwara). The rural death rate (30·22) was only slightly lower than the urban (30·90). April was the month of maximum mortality and July the month with fewest deaths.

The infantile mortality was 230·86 per thousand births as against 293·60 in the previous year, a very large decrease. This question of infant mortality is attracting much attention locally. Arrangements have been made for attendance on maternity cases in many municipal towns and whole-time women doctors have been entertained. A children's hospital has been opened in Jubbulpore.

Improvement has been effected in the matter of registration of vital statistics in municipalities, and the importance of the matter is more generally appreciated.

Excepting small-pox, all diseases had a lessened incidence compared with 1912. Cholera was responsible for a death rate of 1·10 per mille (15,286 deaths), and was prevalent in all districts except three. The importance of fairs as the starting point of cholera outbreaks has been amply illustrated by the history of the disease in these provinces and pilgrims returning from fairs seem to have been responsible for most of the cholera in the year under report. Anti-cholera measures were prosecuted with commendable energy, but as the provincial Sanitary Commissioner remarks: "There are cases where nothing can avail so long as the habits of the people lead them to bathe in and drink foul river water as a religious observance, or with the object of escaping from disease and debt". Illustrative of difficulties of sanitary administration, the story is told of how a constable employed for some hours in turning people away from a contaminated water supply ended by washing in and drinking the water himself. He acquired cholera.

Small-pox caused a death rate of ·46 per mille as compared with ·33 in 1912. Proposals to improve the vaccination staff are under consideration, and much good is expected from the introduction of urgently needed reforms.

The deaths attributed to "fevers" amounted to 14·05 per mille as compared with 19·41 in 1912. The general malaria survey of the province is nearing completion. An experiment in jungle-clearing and water tidiness is being carried out. Quinine is becoming better known in remote parts, and the demand for it is increasing.

To dysentery and diarrhœa were ascribed 34,660 deaths, 24,165 fewer than in 1912. Bowel disease is much more prevalent in Berar than in the rest of the province.

Only 512 deaths (·04 per mille) were attributed to plague as compared with 19,199 in 1912. The mortality was the lowest recorded since 1901. The year closed with the province free from plague, an event which has only once before occurred since 1898. 2,046 inoculations were performed. The work done by the plague staff, equipped with travelling dispensaries, is highly spoken of.

Madras.

67. Rainfall was in slight defect of the average of the past 40 years and this defect was experienced in 18 of the 25 districts. The price of food grains varied but little from those current in 1912, but they are very much above the average prices of the last fifteen years.

The provincial birth rate rose from 30·9 in 1912 to 32·2 per mille, 32·1 being the quinquennial average. Lower Burma alone amongst the provinces of India returned

a lower rate in 1913 than this. The highest district birth rate was 38·7 in Guntur and the lowest (25·4) in Ramnad. The urban and rural birth rates worked out to exactly the same figure (32·2). There were 104·5 male to every 100 female births.

The provincial death rate fell from 24·3 per mille in 1912 to 21·4. The mean rate of the previous five years was 24. Thus Madras has once again a lower death rate than any other province of India. The district rates varied between 40·3 in Madras and 16·9 in Godavari. The rural death rate was 20·8 as compared with an urban rate of 26·2.

The provincial death rate was highest in January, lowest in May. The infantile mortality rate was 180 per thousand births against 190·4 in 1912.

Cholera exacted a toll of ·9 per mille as against 2·3, the cholera death rate for 1912. The disease was reported from all districts, in nine it was present all the year round. Anantapur (4·7 per mille) and Tanjore (2·5) were the two worst infected districts. January was the month of maximum incidence. Of towns, Palni was most severely affected, the death rate there being 19·0 per mille. Palni is a town of pilgrimage and outbreaks of cholera in western districts were ascribed to this fact.

Small-pox caused 14,802 deaths (·4 per mille), Coimbatore was the worst infected district.

Plague was responsible for 5,310 deaths (·1 per mille). Coimbatore had the largest death rate (1 per mille) followed by North Arcot (·9) and Bellary (·6). The town of Tiruppattur suffered much more severely than any other, having had a plague death rate of 44·3 per mille. The "passport" system of plague prevention was in force throughout the year. It has since been replaced by the "notification" system.

The death rate from "fevers" was 6·7 per mille,—nearly a third of the total mortality—as compared with 7·6 in 1912 and 7·8 the quinquennial average. In only three districts was the death rate above the preceding five years' average. More fever deaths occurred in January than in any other month. A considerable amount of malaria investigation work was carried out by the two special malaria officers and a stegomyia survey of the ports of Madras, Negapatam and Tuticorin was completed during the year.

City of Madras.

68. The number of births in the City of Madras in 1913, was slightly less than in the two preceding years, the rate being 37·5 per thousand of the population compared with rates of 38·8 and 38·3 in 1912 and 1911, respectively. Of the total births in 1913, 18·9 per cent. took place in hospitals. Measures have been taken to improve the registration of vital statistics in the City and it is considered that in course of time the registration of births and deaths is likely to become more popular, as even now there is a demand for authenticated certificates. The birth rate of Madras City compares very favourably with that of the other chief presidency towns. The rate of infantile mortality, which was 305·4 per thousand births in 1911, and 280·0 in 1912, was 293·4 in 1913. The death rate of the year was 39·9 per mille to which it rose from 38·8 in 1912. Malaria, dysentery and diarrhœa, in the order mentioned, were the chief causes of mortality.

A report on the anti-malaria operations carried out during 1913 in the City, prepared by the Special Malaria Officer, mentions that malaria has been present in a severe form as far back as records go, and the northern end of the City has always been the most severely affected area. In other portions of the City, however, the disease appears to have shown a greatly increased incidence during recent years.

Coorg.

69. A still further fall in the birth rate was reported from Coorg from 26·32 in 1912 to 25·88 against a quinquennial mean of 26·70. These figures are very much lower than the rates returned for any of the Indian provinces. Fortunately the year witnessed a fall in the death rate from 38·37 in 1912 to 33·48 (quinquennial mean 33·04). The excess of deaths over births is stated to be due to the mortality among immigrant coolies in hospitals at Mercara and Virajendrapet. From the point of view of mortality June was much the most unhealthy month. The deaths in June were two and-a-half times as numerous as those that occurred in December, the month of minimum mortality. The infantile mortality rate for males was 300·25 and for females 266·52 per thousand births. Of the 5,859 deaths recorded in Coorg, 4,584 were ascribed to "fever", 1,113 less than in the previous year. There were 192 deaths from cholera, 41 from small-pox and 10 from plague.

Bombay.

70. The main features of the rainfall were rapid penetration of the monsoon giving rise to excessive rain in Gujarat and more than the average in nearly all parts of the Presidency; and general defect in August, September and October. Famine conditions were present in Ahmednagar; elsewhere the prices of food grains approximated the normal.

The provincial birth rate was 34·96 per mille, as against 34·97 in 1912 and 35·92 the mean rate of the previous quinquennium. The district rates varied between 49·81 (West Khandesh) and 17·38 (Nawabshah). Of towns Sholapur had the highest rate (61·82). The rural birth rate (36·45) was in considerable excess of that of towns (27·29). There were 108·15 male for every 100 female births.

The provincial death rate fell from 34·88 in 1912 to 26·63, a figure 2·98 per mille below the mean of the previous five years. The district rate was highest in Broach (36·97) and lowest in Hyderabad (13·27). The urban rate (32·90) was 7·49 per mille in excess of that of rural areas. November was the month of highest mortality, June the month of lowest. In 1912 Bombay had, excepting the Central Provinces, the highest death rate in India. This year it comes eighth on the list of provinces in this respect.

The birth rate exceeded the death rate by 8·33 per mille. Infant mortality was 188·42 per thousand births against 218·70 the previous year. In Bombay City the ratio based on recorded statistics was 384·54. Worked out on the corrected number of births the rate was 268·74 against 322·3 in 1912 and 288·8 in 1911. Much is being done in Bombay City towards ameliorating the appalling condition of which these figures bear eloquent testimony.

Cholera was responsible for 5,134 deaths contrasted with 64,505 in 1912. May was the month of greatest mortality. Satara and Sholapur were the two worst infected districts and both apparently derived infection from pilgrims infected at the

annual fair held at the village of Shinganapur. The disease died out entirely in November.

There were 9,833 deaths (·50 per mille) from small-pox in 1913 as compared with 6,331 in the previous year and 5,315 the decennial mean. Only once during the last twelve years has this year's small-pox mortality been exceeded. 2,160 deaths occurred in April the month of maximum incidence. West Khandesh was the worst infected district where the year's mortality was as high as 3·28 per mille, the highest district small-pox death rate in India. A feature of the outbreak was the severe infection of several large towns. Poona had a death rate of 4·41 per mille. The case mortality was everywhere low and it is possible that in many places chicken-pox, which was prevalent, was confused with small-pox. In the southern registration district the average age at death of the vaccinated was 19, of the unvaccinated 6.

The death rate from "fevers" was 12·58 per mille against 14·62 in 1912 and 13·11 the quinquennial mean. Of districts, Ahmedabad had the highest fever death rate (25·30), Belgaum the lowest (5·08). Bombay City death rate was 3·11. November was the month of maximum incidence. Thirty seven sub-assistant surgeons were employed on special malaria duty for from four to five months, visiting all the villages in their respective charges two or three times a month. 2,452 lbs. of quinine were sold and distributed in the Presidency exclusive of that dispensed at hospitals and dispensaries. School quininization was pushed in the province of Sind with beneficial results.

A still further fall in the number of plague deaths was recorded; from 28,984 in 1912 to 25,288 in the year under report. The decennial mean is 92,781. In only two years in the last decade has there been a lower plague mortality than in 1913. The disease was fairly widespread. The continued immunity to plague of the towns and villages on the coast line of Kanara is of great interest. Satara was the worst infected district. The epidemic reached its height in October. 175,456 persons were inoculated during the year.

City of Bombay.

71. Climatic conditions were favourable. The rainfall amounting to 70·96 inches was in considerable excess of that of the previous two years. Compared with previous years the general health was good. Plague was the only disease that could be called epidemic and this disease was less prevalent than in any previous plague year excepting 1912. The death rate (32·47) was the lowest since the advent of plague in 1896. In 1912 it was 39·77. Tuberculous disease had a smaller death rate than ever before. Small-pox and fevers were both much less prevalent than in the years immediately preceding 1913.

There was a decline in the birth rate from 21·96 in 1912 to 20·05 (19,644 births against 19,821 the decennial average). From a census of various selected chawls it appeared that 10·5 per cent. of births were unregistered. 46 per cent. of the decrease in the death rate was among children under five years of age, a most gratifying feature of the health returns of the year.

There were 2,158 fewer deaths among infants under one year of age than in 1912 and 1,137 fewer than the quinquennial average. The decrease was noticeable under each head. It would appear that the energetic measures in force in Bombay to control infant mortality are achieving a noteworthy degree of success.

72. Rainfall was in excess of that of the previous year. Rice, the staple food product, was everywhere cheaper than in 1912.

Burma.

The birth rate in Lower Burma was 31·74 as compared with 31·68 in 1912 and 33·47 the quinquennial mean. Lower Burma thus had a lower birth rate in 1913 than any other province in India. In Upper Burma it was 34·20 as against 32·96 in 1912 and 35·56 the mean of the previous five years. The lowest district rate in Lower Burma was 18·87 in Rangoon, and in Upper Burma 25·55, in Minbu. Tavoy heads the Lower Burma districts with a rate of 41·17, and Pakokku 39·19, has the biggest rate of Upper Burma districts. In Lower Burma the rural birth rate (32·99) is much in excess of the urban rate (23·08) whilst the reverse state of affairs was witnessed in Upper Burma where the urban rate (34·94) was ·80 per mille in excess of the rural rate. In Lower Burma the low urban rate is probably correctly explained by the excess of males over females amongst the urban population. In only 12 out of 41 towns in Lower Burma did the births exceed the deaths and in only 7 out of 18 in Upper Burma. There were 107 males born for every 100 females in Lower Burma, and 105 in Upper Burma.

The death rate in Lower Burma fell from 26·00 in 1912 to 23·58 (26·46 mean of previous five years), and in Upper Burma from 28·95 to 27·60 (29·81 quinquennial mean). The Lower Burma rate was, excepting Madras, the lowest provincial rate in India. These figures are evidence of the comparative healthiness of 1913. Mandalay (39·43) and Kyaukse (38·97) both in Upper Burma, head the list of districts with regard to death rates. Thayetmyo in Lower Burma comes third with a rate of 31·11. Thaton (18·66), Mergui (19·14) and Toungoo (19·23), all in Lower Burma, record the lowest rates.

The average urban death rates in Lower and Upper Burma were 32·89 and 39·26, respectively, whilst the corresponding rural rates were 22·24 and 26·51. Mortality rates were highest in August and lowest in May in both Lower and Upper Burma. Infant mortality rates in Upper Burma (263·27 males, 230·09 females per thousand births) were higher than in Lower Burma where the corresponding figures were 224·04 for males, and 187·39 for females. High as these figures are they show a welcome decrease from those returned for 1912. In only two other provinces in India, *viz.*, the Central Provinces and the United Provinces, did the infant mortality rate in 1913 exceed that of Burma. Insufficiency of information as to the cause of deaths in infants and their age at death adds to the difficulty of the problem of infant mortality. The subject is one which is attracting increased attention locally, and the Society for the Prevention of Infantile Mortality is continuing its good work. 124,883 entries in birth and death registers were checked in Lower Burma and 121,904 in Upper Burma. The omissions in both cases amounted to ·7 per cent.

Cholera was responsible for a death rate of ·44 as compared with ·81 the quinquennial mean. Lower Burma was chiefly affected. Myaungmya had the highest district cholera death rate (2·53). In Upper Burma the death rate was only ·18.

Small-pox had a mortality rate of ·29 against a quinquennial mean rate of ·40. The prevalence in Upper and Lower Burma was approximately the same.

Plague caused 4,308 deaths (·44 per mille) against ·31 in 1912 and ·67 the previous five years' mean. The urban district of Rangoon had a death rate of 3·05 and Amherst 1·60. All other districts had rates of less than one per mille.

"Fevers" were responsible for a death rate of 8·42 against 8·72 in 1912, and 8·84 the previous five years' mean. Maubin district had a death rate of only 2·36 per mille, a lower fever death rate than that of any other district in any province of India. Tavoy had the highest rate (14·74). The distribution of quinine in the Minbu district was undertaken by two travelling dispensaries.

Enteric fever appears to be becoming more generally prevalent, or at any rate more frequently recognised. Beri-beri was very prevalent in the Akyab district. Leprosy appears to be on the increase in the Chin Hills.

Rangoon.

73. During 1913 the birth rate in Rangoon was 18·87 per thousand of the population against 18·25 in 1912. The death rate in 1913 was 30·37, the lowest on record, to which it fell from 35·28 in 1912. The rate of infantile mortality showed an improvement, having been 269·06 as compared with 331·28 in the previous year. The marked fall must, the Health Officer considers, be considered as a corollary to the lower general death rate rather than to any special factor favourably affecting infant life. There are prospects of the formation of a society having as its object the checking of the great waste of infant life.

Plague caused 941 cases with 896 deaths as compared with 866 cases and 817 deaths in 1912. Cholera and small-pox were both less prevalent than in the previous year.

In association with the Royal Sanitary Institute, London, courses for training Sanitary Inspectors every six months have been arranged. Lectures are given in Rangoon by the Health Officer, examinations being held in June and December. Of 21 candidates examined in December 1913, 12 were successful.

The report of the Port Health Officer for 1913 has been published in full for the first time. Incoming vessels numbered 1,227 against 1,210 in 1912, and the number arriving in quarantine totalled 17 against 31 in 1912 and 92 in 1911. There were 9 cases of infectious diseases detected on board incoming vessels against 15 in the previous year, namely, 3 cases each of plague, cholera and small-pox.

Ajmer-Merwara.

74. A fall in the birth rate from 47·08 in 1912 to 43·19 (mean of previous five years 41·86) and a still more marked fall in the death rate from 38·25 in 1912 to 25·85 (quinquennial average 42·93) are the chief features of the Ajmer-Merwara returns for the year under report. October was the healthiest month, and March the most unhealthy; the deaths in the latter were more than fifty per cent. in excess of those of the former.

The year appears to have been an extremely healthy one. Of the 12,960 total deaths, 10,886 were ascribed to fever and 620 to dysentery and diarrhœa. There was no death from cholera or plague and only 20 from small-pox. March was the month of maximum fever mortality, a circumstance which would seem to imply that no very large proportion of fever deaths were directly due to malaria.

Haj Pilgrimage, 1912-13.

75. Of the 83,295 pilgrims to the Haj from overseas, 13,401 were from India and Afghanistan. In August and September 1912 there was a severe outbreak of cholera in Camaran. Mecca was infected with cholera from the outset; infection was introduced probably from the north. Very large numbers of pilgrims died of cholera: exact figures are not forthcoming, but it is stated that a death roll of 800 to 1,000 a day continued for a week. The Vice-Consul at Jeddah points out that the majority of deaths that go to make up the huge annual mortality of Mecca are due to water borne diseases, *viz.*, cholera and bowel complaints. The water supply of Mecca is plentiful but quite unprotected and liable to every form of contamination. Improvement in the water supply is a most urgent need.

A flood of extraordinary violence overtook the pilgrims at Hamara; 800 Indian pilgrims are said to have perished.

1,227 destitute Indians were repatriated free of charge and the Government of India supplied 500 of these with free tickets for the homeward journey.

Efforts made by the Jeddah Sanitary Commission to improve that town are meeting with some success. A greater cleanliness of the streets, improvement in rest-houses and the quay are noticeable signs of progress. The hospital is gaining in favour. In the month of November there were 370 cases of cholera in Jeddah. Plague was epidemic.

The report of the year's work at the Camaran quarantine station discloses many sanitary defects there which urgently call for reform.

Deaths of civil officers and pensioners.

76. In February 1913, the Government of India amplified the orders concerning the reporting of the deaths in India of all European officers and pensioners. It was ordered that reports should be made by certain departments of the death of all civil officers in active employ, military officers in civil employ and all those in receipt of pension from Government. Deaths of military officers in active military employ are recorded in the military returns. It was directed that a copy of the death returns dealt with by the several departments of Government, should be communicated to the Sanitary Commissioner with the Government of India.

During 1913, a total of 78 deaths of officers in civil employ and pensioners was intimated, and the following statement affords information of the causes of death and ages, arranged according to five age groups.

Deaths from	Number of deaths.	Age at death.				
		20—30 years.	30—40 years.	40—50 years.	50—60 years.	60 years and over.
Cholera	1	...	1	...	...	...
Plague	1	...	1	...	...	...
Beri-beri	1	...	...	1	...	...
Malaria	4	2	...	...	1	1
Enteric fever	5	1	2	1	...	1
Dysentery	4	...	1	2	1	...
Liver abscess	2	...	1	1	...	...
Diarrhœa	1	...	1	...	...	...
Pneumonia	7	...	3	3	...	1
Tuberculosis	3	2	1	...	...	...
Other respiratory diseases	4	...	2	...	1	1
Appendicitis	2	...	2	...	...	...
Kidney disease	3	...	...	1	1	1
Heart disease or heart failure	12	...	...	3	3	6
Heat-stroke	3	...	2	...	1	...
Suicide	1	...	1	...	...	...
Homicide	2	...	1	1	...	...
Accidental shooting	2	...	...	2	...	...
,, drowning	1	1	...	...	...	...
Snake-bite	1	...	1	...	...	...
All other causes	18	...	2	5	2	9
Total ...	78	6	22	20	10	20

SECTION IV.

JAILS OF INDIA.

Agricultural conditions.

77. From the agricultural point of view the earlier months of 1913 were satisfactory. The monsoon period was, however, disappointing and the prevalence of drought was reported by the United Provinces, Punjab, Rajputana and Central India. At the end of the year gratuitous relief was being distributed in Merwara and the Sholapur and Satara districts of Bombay and the Jalaun, Jhansi, Hamirpur and Banda districts of the United Provinces.

In spite of somewhat adverse climatic conditions, the total outturn of the wheat crop was 14·7 per cent. above the average of the preceding five years. The rice crop suffered; the outturn was 13·5 per cent. below that of 1912; the chief decrease was in Bihar and Orissa where the yield was 33 per cent. below that of the previous year.

The sugar-cane crop was very good, the yield being the highest on record, 20 per cent. above the average of the previous quinquennium.

Prison Population in 1913.

78. In years of scarcity the prison population generally increases. In 1913 every province of India showed an increase in the average daily number of prisoners with the single exception of the United Provinces. The average prison population fell in 1912 to 92,626. This was, as explained last year, partly due to the release of convicts and civil prisoners on the occasion of the Imperial Delhi Durbar in November 1911. In 1913 the population rose to 96,745, a figure which is 1,953 in excess of the average for the decennium 1903-1912.

Sickness and Mortality Rates, excluding the Andamans.

79. In last year's report the marked improvement in the health condition of Indian jails was commented on. The improvement is still maintained, for though the admission to hospital rate (for all causes) rose from 535·6 per mille in 1912 to 540·2 in the year under report, the death rate declined from 16·74 per mille in 1912 to 15·52 in 1913 (average of preceding decennium 19·55).

This rate of mortality is the lowest ever recorded for Indian jails.

The constantly sick rate rose from 25 to 26, which figure is, however, somewhat lower than the average for the decade 1903-12.

The chief causes of sickness were—

Disease.	Admission rate.
Malaria	108·2 per mille.
Abscess, ulcer and boil	57·8 „
Dysentery	55·6 „
Diarrhœa	38·0 „
Respiratory diseases	24·6 „
Fevers of uncertain origin	24·5 „

and the principal causes of death—

Disease.	Death rate.
Tubercle of the lungs	2·94 per mille.
Dysentery	2·16 „
Pneumonia	1·80 „

Malaria.

80. The following table shows that the very striking improvement recorded under this head last year has not been quite maintained. The figures, nevertheless, present several satisfactory features.

Admission rates from malaria per thousand of average daily strength.

Province.	1894-1898.	1899-1903.	1904-1908.	1909.	1910.	1911.	1912.	1913.
Burma	159·5	131·6	45·2	35·5	45·4	44·0	30·4	23·6
Assam	450·8	305·3	328·2	573·9	229·6	197·6	152·5	154·3
Bengal	292·2	263·5	273·3	230·3	267·3	251·9	252·1	268·4
Bihar and Orissa	359·1	395·9	311·2	262·3	209·4	214·3	179·3	147·5
United Provinces	296·3	260·7	226·3	212·1	123·2	94·0	74·2	78·2
Punjab	680·5	560·5	255·4	139·3	116·0	98·2	137·3	101·6
North-West Frontier Province ...	819·3	437·1	532·1	504·4	353·1	197·6	337·9	506·0
Bombay	311·7	241·7	150·2	123·8	96·3	86·8	67·0	72·6
Central Provinces	273·9	329·5	193·5	151·3	104·8	65·7	49·5	28·2
Madras	150·4	100·3	73·2	81·0	94·2	64·2	49·1	32·0
India, excluding the Andamans	298·5	238·4	199·5	172·4	134·7	113·8	105·2	108·2

As in 1912, the North-West Frontier Province records much the highest admission rate for malaria—506·0 per mille, a higher figure than has been recorded for any province for the last four years. The other provinces that show increased admission rates are Assam, Bengal, the United Provinces and Bombay, but in no case, except that of Bengal in which the rate increased from 252 to 268, was the increase considerable.

On the other hand Burma, Bihar and Orissa, the Central Provinces and Madras record lower malaria admission rates for 1913 than they have ever done before. Burma has pride of place in this respect with the extremely low rate of 23·6 per mille.

The death rate from malaria for all the jails of India was ·62 per mille compared with ·52 in 1912 and ·96 the average for the past decade. Assam returned the highest malaria death rate—4·19 per mille—followed by Madras with 1·09 and the North-West Frontier Province with 1·00. All the other provinces had death rates lower than 1 per mille from this cause.

Dysentery.

81. There was a slight increase in the admission rate for dysentery as compared with 1912, but the satisfactory decline in the death rate from this disease continues. The admission rates per mille for the last four years have been 1910, 57·7: 1911, 56·6: 1912, 55·4: 1913, 55·6: whilst the corresponding death rates were 3·46, 2·91, 2·59, 2·16. Assam as usual has the highest death rate from this cause, *viz.*, 11·96 per mille as compared with 15·62 in the previous year. The Madras death rate of ·54 is the lowest. The decline in the Central Provinces death rate from dysentery noted in last year's report continues and in 1913 the rate fell to 1·95 per mille, the lowest yet recorded in those provinces. The figures for 1911 and 1912 were 11·47 and 3·83, respectively.

Tubercle of the lungs.

82. Once again this was the chief cause of mortality in Indian jails, though the decline in the death rate from 3·18 per mille in 1912 to 2·94 in the year under report is satisfactory. The average rate for the previous decade was 3·32.

The Punjab heads the list with a phthisis death rate of 5·89 per mille. All the other provinces except Assam and the North-West Frontier Province show a diminished rate compared with 1912.

83. There were 34 admissions and 17 deaths from cholera in the jails of India during 1913. There was no death from this cause in Madras, the Central Provinces and the North-West Frontier Province.

Cholera.

84. One hundred and three cases of enteric fever with 17 deaths were recorded.

Enteric Fever.

85. No fewer than 2,375 cases of fever were returned under this head, of which 9 proved fatal.

Fevers of uncertain origin.

86. The average daily strength of prisoners in 1913 was 752 higher than in 1912. As pointed out in last year's report, the fall in numbers in 1912 was largely attributable to the release of convicts and civil prisoners on the occasion of the Delhi Durbar.

Bengal.

The admission to hospital rate (1,068·6 per mille) and the daily sick rate 50·7 per mille were both higher than the corresponding figures for 1912, *viz.*, 993·3 and 43·7. At the same time the death rate fell from 21·84 to 20·85 per mille.

The Inspector-General points out that increase in hospital admission rates does not by any means necessarily mean increase of sickness, but may only indicate more use being made of hospitals. That this was so in the present instance the lessened death rate would certainly seem to indicate, a result probably brought about by more adequate treatment of the sick. On the whole the health conditions were satisfactory, the improvement being attributed to "increased attention, prompt admission to hospital, a good supply of clothing, absence of marked overcrowding and to less frequent changes in the *personnel* of the medical subordinates."

There were 6 cases (and 2 deaths) from cholera, one in each of six jails. All the cases were either recent admissions or prisoners employed outside the jail. In no case did the disease spread.

Dysentery was responsible for more deaths than any other single cause and was second only to malaria as a cause of admission to hospital. There were in 1913, 2,046 admissions with 66 deaths as against 1,709 and 43 in 1912.

Dysentery in the Bengal jails is at present the subject of a special inquiry which is being carried out by Captains Cunningham and King, I.M.S., under the auspices of the Indian Research Fund Association. No report has yet been published. In the Barisal jail, where dysentery is more prevalent than in any other, the disease is mainly of the bacillary type.

Deaths from malaria fell from 18 in 1912 to 11 in 1913 though the admissions rose from 2,679 to 3,026. There was no unusual prevalence of the disease in Bengal in the year under report. Prophylactic quinine was administered in all jails.

There were 35 deaths from tuberculosis as against 35 in the previous year. The Inspector-General again calls attention to the urgent need of a special tuberculosis jail.

87. The daily average prison population rose from 1,600 in 1912 to 1,672 in 1913. Except in the smaller district jails and the sub-jails there was no marked overcrowding. Both hospital admission and death rates show an increase over those for 1912—1,023·3 and 40·67 per mille, respectively, as against 900·6 and 37·59.

Assam.

Once again the Assam jails return a death rate far and away the highest of all the provinces of India. In fact Bengal, the next highest, has a jail death rate of 20·85, very little more than half the rate of Assam. Only two district jails had death rates below 30 per mille, *viz.*, Shillong and Sylhet. The remaining eight had rates varying from 33·98 in Tezpur (7 deaths) to 333·33 in Aijal (3 deaths).

There were 3 cases of cholera with 2 deaths.

Dysentery was the chief cause of sickness and mortality. Admissions to hospital from this cause amounted to 303·2 per mille and the death rate to 11·96. This high prevalence of dysentery is thought to be connected with ankylostomiasis which is so common in Assam. In this connection it is important to note that "anæmia and debility" as a cause of death is more commonly met with in the jail reports of Assam than in any other province of India.

Malaria comes second as a cause of sickness (admissions 154·3 per mille) and was responsible for 7 deaths, 4·19 per mille. There were 10 deaths from pneumonia and 4 from phthisis. There was no enteric fever.

Six prisoners were released on account of sickness, of whom five were known to be dead on the last day of the year; 42·84 per cent. of prisoners discharged had gained weight and 31·65 had lost weight during confinement. The weights of the remainder had remained stationary.

Bihar and Orissa.

88. The average strength of prisoners rose from 6,320 in 1912 to 6,697 in the year under report. The health of the prisoners is stated to have been on the whole satisfactory. Though the death rate rose from 17·88 per mille in 1912 to 20·01, the hospital admission rate fell from 783·3 to 714·9. The higher rate of mortality was largely due to the unhealthiness of the Muzaffarpur jail where 17 deaths (55·02 per mille) occurred as against 4 in 1912. Puri had the highest death rate—54·35 per mille.

There were 5 sporadic cases of cholera, 2 of which terminated fatally. There were 3 fatal cases of plague at Bhagalpur. It is not clear how they became infected. Dysentery was less prevalent than in 1912 (admission rates 89·7 and 100·9) but more fatal (death rate 3·88 per mille as against 2·69). From the good results obtained by treatment with emetine it would appear that amœbic dysentery is the prevailing type. Malaria was responsible for more sickness than any other disease but was less prevalent than in 1912 (admission rates 147·5 and 179·3 per mille respectively). Three deaths were ascribed to malaria. In all except four jails prophylactic quinine was employed, with apparently satisfactory results.

Next to dysentery, phthisis was responsible for more deaths (21) than any other disease. It was less prevalent, however, than in 1912, in spite of a larger prison population. The special attention that is being paid to this disease, resulting in the segregation of patients, proper ventilation of wards and workshops and the disinfection of discharges of patients, appear to be productive of good results. Of the prisoners discharged 55·01 per cent. had gained weight, 20·15 per cent. had lost weight and the weights of the remainder had remained stationary during their imprisonment.

United Provinces.

89. There was a slight decrease in the average daily population of the jails of these provinces in 1913 compared with the previous year, but there was a small increase in the number of prisoners sent to jail. The latter fact is attributed to the scarcity prevailing in several districts consequent on deficient rainfall. The increase in population due to scarcity is less marked than in previous years when similar conditions prevailed.

The marked improvement in health conditions that was commented on last year is well maintained. It is true that the death rate increased 1·02 per mille, but it is still at the remarkably low figure of 11·50 per mille—all the more remarkable when it is recalled that 1913 was a year of comparative scarcity. The admission rate fell from 425·7 in 1912 to 405·8 and the constantly sick from 23 to 21 in the year under report. In 1912 the United Provinces jails had lower death rates than those of any other province. This year they come second only to Madras, where the death rate was phenomenal. All the central jails were healthy.

The Fatehgarh and Allahabad central jails had death rates of 6·15 and 8·16 per mille. In many of the district jails the figures were much lower than these. Mirzapur jail, formerly one of the most unhealthy in India, had no death at all.

There was no epidemic of cholera. There were, however, 6 imported cases with 3 deaths from this disease. The prevalence of dysentery year by year diminishes and a further fall in the death rate from this disease to 1·37 per mille from 1·88 in 1912 is recorded. The Inspector-General again expresses the opinion that improved cooking arrangements and the anti-malaria prophylactic issue of quinine are the two factors of chief importance in determining this diminished incidence of dysentery.

Malaria was not very prevalent. Only 12 deaths were ascribed to it. Prophylactic quinine was given to all prisoners in the autumn months.

It is most gratifying to note that though tubercle of the lungs was next to pneumonia the most important cause of mortality, its prevalence is decreasing in the jails of these provinces. For 1913 an admission rate of 4·4 per mille and a death rate of 1·56 per mille were returned. The corresponding figures for 1912 were 7·4 and 2·02. Pneumonia caused 40 deaths, a greater number than was attributed to any other single disease.

90. The prison population of the Punjab is still steadily rising and more prison accommodation is urgently required. There was overcrowding at some time or other in all jails. In spite of this, the year was a fairly healthy one. The admission to hospital and the constantly sick rates show an increase over those of 1912, but the death rate fell from 19·42 in 1912 to 16·81 per mille. The average death rate for the previous decade was 21·29.

Punjab.

An outbreak of cholera occurred in August in the Lahore central jail, which was responsible for 5 cases and 3 deaths. There was some evidence to indicate that flies were responsible for the spread of infection. The whole jail turned out into camp and the epidemic promptly ceased. The death rate from dysentery fell from 2·62 per mille in 1912 to ·93: the admission rate from this disease remained fairly constant however, facts which would seem to indicate that the disease was of a milder type than usual.

Malaria was responsible for the comparatively very low admission rate of 101·6 per mille, which is less than half the decennial average. Five deaths were ascribed to malaria, but in none of them was the diagnosis based on microscopic examination.

The most disquieting feature of the health report of the Punjab jails is the continued increase in the prevalence of tuberculosis. The admissions to hospital from tubercle of the lungs were 23·6 per mille (13·0 in 1912). The death rate, 5·89 per mille, is approximately a third of the death rate from all causes. Montgomery jail is the worst infected and here 17 deaths from phthisis occurred during the year. The seriousness of the situation is recognised and every endeavour is being made to cope with it. The urgent need for a special tuberculosis jail is fully realized. This has been delayed by the difficulty in obtaining a suitable site.

Pneumonia was responsible for 30 deaths. Not a single case of plague occurred. Cases of cerebrospinal meningitis occurred in three jails.

North-West Frontier Province.

91. The average strength of the jail population increased from 1,622 in 1912, to 2,008 in the year under report. The preceding decennial average was 1,373. There was overcrowding in all jails. It is stated, however, that this overcrowding was not detrimental to health as the excess population were accommodated in tents. The constantly sick numbered 22 per mille, the same number as in the previous year, but the admission to hospital and death rates both showed increases, the latter from 11·71 per mille in 1912 to 15·44 in 1913. This latter figure is still well below the decennial average 17·40 per mille.

Thirty-one deaths occurred amongst prisoners, 4 from tubercle, 7 from pneumonia, 3 from respiratory disease, 4 from dysentery, 2 from malaria, 11 from other diseases. The admissions for malaria were double those in the preceding year. Quinine prophylaxis was enforced in all jails.

Central Provinces.

92. The daily average number of prisoners was 451 more than in 1912. The figure is still below the preceding decennial average.

The year was a particularly healthy one. The admission to hospital rate, the daily average sick and the death rate, were all considerably lower than in any one of the past ten years. The death rate (13·40) is in fact the lowest ever recorded in the jails of these provinces. The Central Provinces jails thus had a lower death rate in 1913 than had the jails of any other administration, Madras and the United Provinces excepted.

There was 1 case of cholera admitted to jail during the incubation period which recovered. The dysentery death rate was only 1·95 per mille as compared with 3·83 in 1912 and 5·38, the decennial average—a most gratifying improvement. Malaria caused less sickness than in the jails of any other administration with the exception of Burma. The hospital admissions amounted to only 28·2 per mille—decennial average 167·5. Since 1908, the fall has been a steady progressive one. Prophylactic quinine continues to be employed.

The admission and death rates from pulmonary tuberculosis are very comparable to those of 1912—7·8 and 3·07 per mille, respectively, as against 8·0 and 3·51. Tubercle caused more deaths than any other disease.

Sixty-six per cent. of prisoners discharged had gained in weight, 12 per cent. lost weight, and the weights of the remainder had remained constant during their imprisonment.

Bombay.

93. An increased jail population, a slightly increased admission to hospital rate and a decreased death rate, characterised the Bombay jails in 1913 as compared with the preceding year. The fall in the death rate from 17·23 in 1912 to 15·42 per mille—decennial average 19·09—is particularly satisfactory. Compared with 1912 all diseases, except respiratory diseases, malaria and diarrhœa, had lower death rates attendant thereon and the increases in the rates from these three diseases were but trifling.

Of the 150 prisoners who died in the central and district prisons 41 were admitted in bad health, 16 of these suffering of the disease from which they died.

There was 1 case of cholera. Malaria was somewhat more prevalent than in 1912. The issue of prophylactic quinine was almost universally adopted. There was no epidemic of any kind.

Of prisoners liberated 54·6 per cent. had gained weight, 19·8 per cent. had lost weight, and the weights of the remainder had remained stationary.

Madras.

94. The average strength of prisoners, 9,178, was slightly in excess of the number for 1912—9,056, but was still below the decennial average 10,003. From the point of view of sickness and mortality the year was a record one. The constantly sick rate fell to the low figure of 16 per mille from 20 in 1912: the admission to hospital rate fell from 428·2 in 1912 to 353·2 and the death rate was only 7·74 per mille as compared with 11·37 in 1912 and 18·95 the average for the preceding decennium. This death rate is the lowest ever recorded for the jails of any of the provinces. It is true that 1913 was a healthy year throughout the province, but the difference between it and former years is not nearly sufficient to explain this remarkable improvement in the health conditions of the jails which might almost be styled phenomenal.

The Inspector-General of Jails attributes it to improvement in general sanitation, in drainage, in kitchens, in ventilation, in latrines, in methods of handling and distributing food and "last, but perhaps not least, in having introduced a more health-maintaining dietary". The year under report was the first in which the new dietary was in force in all the jails of the Presidency. The improvement was manifest in nearly all the jails.

The highest death rate recorded was at the Rajahmundry central jail, 12·51 per mille, and the lowest—of any central jail—was at the Penitentiary, 4·84 per mille. There were two cases of cholera, both of which recovered.

The admission rate from dysentery fell from 34·8 to 23·6 and the death rate from 1·10 to ·54, a much lower death rate than is recorded from any other province and less than half of the Madras rate for 1912.

Malaria showed a decreased prevalence but an increased death rate. Tubercle of the lungs was less prevalent than in the previous year but was responsible for more deaths than any other single cause—1·74 per mille. The diarrhœa admission rate fell from 19·2 to 10·9 per mille and the death rate from ·55 to ·22. The improvement in the returns of intestinal disease inclines the Inspector-General to the belief that the new dietary played an important part in the production of the markedly improved health conditions of the Madras jails.

Burma.

95. The daily average prison population was in excess of that of 1912, but the number of prisoners admitted showed a slight decrease. The constantly sick rate remained at the surprisingly low figure of 15 per mille that it fell to in 1912. The admission to hospital and death rates are both lower than in the previous year, though the latter 16·24 per mille is still higher than the decennial average 15·30.

All diseases except diarrhœa and anæmia were less prevalent than in 1912. The fall in the death rates from 40·96, to 21·70 per mille in Rangoon and from 16·71 to 12·32 per mille at Mandalay, are especially satisfactory. The large number of morphomaniacs admitted to the Rangoon jail is still a factor of much importance in keeping up the number of the daily average sick.

Maubin was the only jail that reported cholera. Here there were 4 cases, 3 of them terminating fatally. The source of infection was not traced, but there was cholera present in the town at the time. Flies were suspected. Though the fall in the admission rate for dysentery was but trifling the mortality rate fell from 2·39 to 1·43 per mille, a satisfactory decrease. Ankylostomiasis was responsible for 4 deaths in the Rangoon jail and 4 elsewhere. Malaria was much less prevalent and only 3 deaths were ascribed to it. Quinine is regularly used as a prophylactic in nearly all jails. Tubercle of the lungs was responsible for a death rate of 4·00. This, as well

as the admission rate of 6·6 per mille, show a decrease on the previous year, but this disease was responsible for one-fourth of the total number of deaths. Insein jail reported most deaths from phthisis, 21, but of this number 6 occurred amongst prisoners transferred from Rangoon for the benefit of their health. There were 48 cases of enteric fever with 5 deaths, a low rate of mortality. The cases were scattered over 9 jails. Moulmein reported 14 cases with 2 deaths and Bassein 11 cases, all of which recovered. Five fatal cases of plague were reported. Morphinism accounted for 182 admissions to hospital and 8 deaths. Of the total number of convicts admitted into jail 11·94 per cent. confessed to be opium eaters.

Of the 272 deaths only 7 occurred amongst those who had spent more than seven months in jail.

Andamans.

96. By the Andamans in this report is meant the convict station of Port Blair, situated on the south side of the southernmost island of the group.

There was a slight increase in the jail population compared with the previous year, which, however, still remains below the decennial average. The actual figures are 1913—11,541 ; 1912—11,280 ; 1903-1912—13,326. The total number of deaths from disease in the Settlement was 272 or 23·56 per mille. This does not include 3 deaths from homicide; 3 from judicial hanging ; 7 suicides and 7 accidental deaths. Including these, the death rate, 25·30 per mille, compares favourably with the rate 31·65 in 1912 and 32·23 the average for the decade 1903-12.

As in 1912 pneumonia caused more deaths than any other disease and was responsible for a mortality rate of 5·20 per mille: dysentery came second 3·55 and then pulmonary tuberculosis 3·47. The fall in the number constantly sick from 75 per mille in 1912—which is also the decennial average—to 53 per mille in 1913 is eloquent testimony of improved health conditions.

The admission rate for malaria remains very high, 963·6 per mille, as compared with 993·7 in 1912 and 1,104·1 the decennial average. There is, however, a welcome fall in the death rate from this disease from 2·57 in 1912 to 1·82 per mille in the year under report. Of the 11,121 admissions for malaria, the blood of 10,387 was examined for parasites. Parasites were found in 3,158. Of this number 33·91 per cent. were benign tertian, 51·36 per cent. subtertian and 14·72 per cent. quartan. Some progress was made in the reclamation of salt-water swamps, the breeding places of *A. ludlowi*, the mosquito chiefly responsible for the spread of malaria in the Andamans. There were no cases of "fever with jaundice" reported but there was one undoubted case of blackwater fever. The fall in the dysentery admission rate from 99·1 per mille in 1912 to 77·6 per mille, and the corresponding death rate from 6·03 to 3·55, is perhaps the most satisfactory feature of this year's health report. The decennial average admission and death rates were 122·4 and 6·72 per mille, respectively. All cases of dysentery are now treated in Viper Island and convalescents will in future be segregated.

The high death rate from pneumonia has been mentioned. The improvement of barrack ventilation does not appear to have done much to lessen the disease though the incidence was decidedly lower than in 1912.

There was an outbreak of epidemic diarrhœa, 196 cases with 26 deaths, in April 1913. Dissemination was rapid. Infection was traced to a Burmese feast: a considerable number of convicts who partook of it subsequently developing the disease. The admission and death rates from phthisis fell from 8·1 and 5·23 per mille, respectively, to 3·8 and 3·47, a marked improvement. It is possible that the improved lighting and ventilation of the barracks that has been effected, may have played an important part in bringing this about.

SECTION V.

VACCINATION.

Vaccination in India.

97. Under existing orders the provincial vaccination reports for 1913-14 relate to the triennium 1911-12 to 1913-14. For the purposes of this section, however, the usual practice of comparing the work of the year under review (1913-14) with that of the preceding year (1912-13) is adopted. The total number of vaccination operations in British India in 1913-14 was 9,877,086; primary cases numbered 8,730,984 against 8,792,917 and revaccinations 1,146,102 against 1,126,806 in 1912-13. Thus there was a decrease of 61,933 primary cases, but an increase of 19,296 revaccinations, leaving a net deficit of 42,637 operations during the year. On the total, the decline in the work of the Vaccination Department was due to decreases in the number of operations performed in Bengal (128,972), the Punjab (145,378) and Burma (25,884); in all the other provinces increases were recorded. In regard to primary work, decreases occurred in Bengal, the Punjab, Bombay and Coorg, and in revaccinations in the Punjab, the North-West Frontier Province, Burma and Ajmer-Merwara. It was only in the Punjab that there was a fall in both classes of work.

The quality of the primary work was better in 1913-14, when a percentage of success of 96·95 was attained, than in the previous year, (96·54) but in revaccinations the rate fell from 70·57 to 69·66. In the former the rates ranged between 99·66 per cent., the highest, in Bihar and Orissa, and 91·8 per cent., the lowest, in Madras: these two provinces gave the highest and lowest rates in 1912-13 also. In revaccinations the highest rate was 91·22 per cent. in the North-West Frontier Province and the lowest, 48·39 per cent. in Ajmer-Merwara. The extremes were higher in primary work in 1913-14 than in the previous year, but lower in revaccinations.

The average number of operations performed by each vaccinator was 1,623, or 7 less than in 1912-13. The highest number, 3,288, was recorded in the Punjab and the lowest, 914, in Assam.

At dispensaries 184,979 operations were performed against 187,450 in 1912-13, but the bulk of these were done in Bengal and Bihar and Orissa.

The ratio of successful operations per mille of the population was 36·19 as compared with 36·49 in the previous year. The ratios varied much in the several provinces, being highest in Coorg 68·50, followed by 53·72 in the North-West Frontier Province, and 45·59 in Assam, and lowest in Ajmer-Merwara 28·75, Bombay 29·62 and in the United Provinces 32·79.

On an estimated birth rate of 40 per thousand of the population, 46·83 per cent. of the children under one year of age were successfully vaccinated, compared with 46·19 per cent. in 1912-13. There were the usual variations in the provincial rates, which ranged between 73·14 per cent. in the Central Provinces and 21·11 per cent. in Burma (excluding the small province of Coorg where the rate was only 11·10 per cent).

The cost of the department increased from Rs. 16,30,427 in 1912-13 to Rs. 17,06,426 in 1913-14. The average cost of each successful case was three annas and one pie, which is two pies more than in the previous year: the variations were between eight annas and nine pies in Bombay and one anna and one pie in Bihar and Orissa.

98. References to the vaccine lymph used in the several provinces will be found in the succeeding paragraphs.

Vaccine lymph.

99. During the year 1913-14, a total of 15,922 vaccination operations were performed in the province, against 13,232 in the previous year. Of the total, 11,450 were primary cases and 4,472 revaccinations against 11,267 and 1,965, respectively. The percentage of success in primary cases was 98·23 against 98·13, and in revaccinations, 61·09 against 65·25 in 1913-14 and 1912-13, respectively. The amount of primary work increased in the municipal area as a result of the opening of an additional vaccination station. Much trouble was also taken in advising parents to have their children protected and in the distribution of pamphlets on the subject. In rural circles the primary work was less, but this was counterbalanced by an increase in revaccination. In three towns house-to-house vaccination was carried out with success. Glycerine calf lymph obtained from the Punjab Vaccine Depôt, was used, the quality of which was uniformly good.

Delhi.

On an estimated birth rate of 40 per thousand of the population, 62·93 of children under one year of age were successfully vaccinated. In the Delhi municipality 5,211 children under one year of age were protected; this number exceeds that calculated to be available and is explained by children being brought in from outside.

The cost of the department was Rs. 2,973 as compared with Rs. 2,403 in 1912-13, and the average cost of each successful case three annas and eight pies or five pies more than in the previous year.

100. The vaccination operations during 1913-14 numbered 1,855,427: these figures, however, exclude 1,867 operations performed on tea-gardens in Jalpaiguri, details of which could not be obtained. The primary cases numbered 1,574,190 and revaccinations 281,237, compared with 1,787,143 and 197,256, respectively, in the previous year, while the rates of success were 98·76 and 64·18 per cent., respectively, against 98·24 and 61·29. Compared with 1912-13, vaccination work showed an increase in 11 and a decrease in 16 districts. The larger increases were recorded in Rangpur (16,119), Khulna (7,623) and Bankura (6,257), and the principal decreases in Bakarganj (70,240), Pabna (17,616), Dacca (13,309), Midnapore (11,865) and Tipperah (11,257). The large decrease in Bakarganj is explained by the discovery that the figures of previous years were totally unreliable, and even the figures for 1913-14 are regarded as being of doubtful accuracy.

Bengal.

The six puncture system of vaccination was introduced in the Eastern Bengal districts in 1912-13, but only a small amount of such work was done during that year in some districts. In 1913-14, however, the method was adopted in every

district, and in spite of some opposition from parents and guardians, 695,807 successful primary operations were performed in six points, against 333,903 in 1912-13 and 273,402 in 1911-12. The revaccinations by this method rose from 7,563 in 1912-13 to 47,899 in 1913-14.

On an estimated birth rate of 40 per thousand of the population, 33·39 per cent. of the infants were successfully vaccinated against 36·41 per cent. the year before. In municipalities 76·84 per cent. were protected against 75·2 per cent. The low rate of infant protection is due, as was mentioned in the last report, to the backward condition of vaccination in the Eastern Bengal districts where there is great opposition to vaccination, especially of infants.

The different methods of vaccination yielded percentages of success as follows—the figures in brackets are for the previous year—primary cases, lymph direct from the calf 97·69 (98·51), lanoline lymph 98·76 (98·19), glycerinated lymph 98·13 (97·28), arm-to-arm 94·91 (90·10): revaccinations, 50·98 (44·78), 55·70 (43·34), 63·76 (62·55) and 56·67 (77·51), respectively.

At the Animal Vaccination Depôt, 2,212 calves were vaccinated during 1913-14 against 2,253 in the previous year, and the quantity of lymph manufactured was 744,054 grains as compared with 675,228 grains.

The cost of the department rose to Rs. 1,98,163 from Rs. 1,72,212 in 1912-13, and the cost of each successful case to one anna and ten pies from one anna and six pies.

Bihar and Orissa.

101. There were 1,323,948 vaccination operations in the province during 1913-14, an increase of 27,635 operations. Of the total, 1,283,557 were primary cases and 40,391 revaccinations as compared with 1,269,400 and 26,913, respectively, in the previous year. It is said that vaccination work is not satisfactory in the Patna district where the people are assuming an active opposition, and conditions are arising which may necessitate the introduction of the Vaccination Act. In Singbhum in the Chota Nagpur Division, it is said that small-pox is becoming endemic in an area round the Tata Steel and Iron Works at Sakchi. The place has sprung into existence recently with a miscellaneous population of about 12,000 and it is difficult to get the people to accept voluntary vaccination. The extension of the Bengal Vaccination Act to the area has been recommended. The Jherria Coal Fields, in the Manbhum district, is a densely populated area where vaccination work is not satisfactory. Vaccination in this area is to be supervised by the medical officer to the proposed Mines Board of Health.

The quality of the work in 1913-14 was better than in the previous year, the percentage of success in primary cases and revaccinations being 99·66 and 71·10, respectively, against 99·59 and 69·35 the year before.

On an estimated birth rate of 40 per thousand of the population, 46·97 per cent. of the infants were protected against 47·01 per cent. in 1912-13. In towns 77·70 per cent. of the available infants were successfully vaccinated, which is higher than the rate of 73·59 in the previous year. The rate in the different towns varies considerably, but the absence of small-pox generally in municipal areas, and the vaccination inspection notes of Deputy Sanitary

Commissioners, indicate that municipal vaccination is on the whole satisfactory. In future the health officers are to be responsible for the supervision of vaccination in the towns to which they are appointed.

Difficulty was experienced in the supply of vaccine lymph. The supply of lanolinated lymph from the Calcutta depôt proved insufficient, and during the middle of the season was further curtailed owing to an outbreak of small-pox in Bengal. The supply was supplemented from the United Provinces Vaccine Depôt. A vaccine depôt for the province is under construction at Namkum, near Ranchi, where it is hoped to prepare lymph for the season 1914-15.

The cost of the department rose from Rs. 82,305 in 1912-13 to Rs. 93,373. Each successful case cost one anna and one pie, an increase of one pie on the cost in the previous year.

Assam.

102. During 1913-14 there were performed by all agencies in Assam, including the hill tracts and the Manipur State, a total of 336,649 vaccination operations, of which 301,241 were primary cases and 35,408 revaccinations, against 333,363, 298,983 and 34,380, respectively, in 1912-13. Increased work was reported from 9 out of the 12 districts. The most noticeable increase was reported from the Garo Hills district where the number of operations was nearly double that in the previous year: the figures are so large for a small and sparsely populated district that there is doubt as to their correctness. The apprehension, referred to in the last report that working the Sylhet district with licensed vaccinators would not be successful, proved only too true and the experiment is not to be repeated. The cause is the difficulty the vaccinators experience in realizing their fees. In the Kamrup district the prejudice of the Mahapurushias to vaccination on religious grounds is slowly being overcome, and in Darrang the prejudices of the Miri sect, formerly offered to the measure, are also being surmounted.

The percentage of success in primary cases and revaccinations was 98·41 and 78·15, respectively, as compared with 97·91 and 73·99 in the previous year. There was thus an improvement in both classes of work.

Dispensary vaccination is practically confined to the hill districts—1,324 operations being performed by this agency against 1,590 in 1912-13. A small quantity of lymph is, however, kept at certain dispensaries in the plains to meet demands for vaccination.

On an estimated birth rate of 40 per thousand of the population, 27·28 per cent. of the infants were successfully vaccinated, against 23·44 in 1912-13. In towns where the Vaccination Act is in force, 78 per cent. were protected compared with 62 per cent. in the previous year. In 1911-12, the India Vaccination Act XIII of 1880 was replaced by the Bengal Vaccination Act V of 1880 in certain municipalities.

At the Animal Vaccine Depôt, 892 calves were inoculated against 962 in 1912-13, and 1,875,886 capillary tubes were loaded as compared with 1,819,859. The average cost of manufacture per tube was 2·1 pies against 2·4 pies the year before.

The cost of the department amounted to Rs. 64,426 against Rs. 66,343 in 1912-13, and the average cost of each successful case was three annas and four pies, or two pies less than in the previous year.

United Provinces.

103. With a total of 1,660,820 vaccination operations in 1913-14, against 1,592,438 in 1912-13, there was again an increase in the work of the department in the United Provinces. Of the total, 1,532,218 were primary cases and 128,602 revaccinations, against 1,468,162 and 124,276, respectively, in the previous year, showing an increase in both classes of work. The total number of persons vaccinated was 1,640,005 and the difference between this figure and the number of operations performed, *viz.*, 20,815, represents persons on whom a second operation was performed because of the failure of the first. Of the 48 districts in the province, there was increased work in 39, the largest increases being reported from Gorakhpore (12,249), Budaun (4,008) and Kheri (3,075). In the last named district printed *rubkars* and *parwanas* in vernacular signed by the district officer, were issued to leading official and non-official gentlemen, inviting them to assist in vaccination: *ziladars* and *patwaris* were also required to prepare lists of children and adolescents available for vaccination in each village. This innovation proved of great service in furthering the cause of vaccination and the question of its adoption in other districts is to be considered by the local Government. Vaccination work showed a decrease in 9 districts, the largest falls occurring in Gonda (3,063) and Ballia (2,721); in the others the decreases were less than 2,000 in each. The reasons for the lessened work varied in the several districts.

The percentage of success in primary cases was 96·08 and in revaccinations 72·44, both being lower than the rates of 97·19 and 73·12, respectively, recorded in the previous year.

On an estimated birth rate of 40 per thousand of the population, 54·08 per cent. of the infants were successfully vaccinated against 52·73 per cent. in 1912-13. In municipal towns 89,605 children under one year of age were calculated to be available and of this number 82,275, or 91·8 per cent. were protected, against 89·3 per cent. in the previous year.

The work at the Patwa Dangar Lymph Depôt has steadily increased since its foundation in 1904-05. In 1913-14 the number of tubes of glycerinated lymph issued was 193,932 against 180,445 in 1912-13; in bulk the issues were 70,296 grammes against 58,427, and of glycerine paste 79 grammes against 83. During the year, 387 calves were vaccinated or one more than in the previous year, and of these 371 against 355 proved successful. The quantity of crude lymph obtained was 14,716·8 grammes against 11,285·0 grammes in 1912-13. No lanoline lymph was prepared as there was no demand for it. The strain of lymph was satisfactory and to maintain its potency, it was from time to time fortified by passage through rabbits. Arm-to-arm vaccination is steadily being superseded; no operations of this nature were performed in 37 districts. The arm-to-arm process has been replaced by calf lymph vaccination in all the 86 municipalities and 46 notified areas in the province.

The cost of the department amounted to Rs. 2,01,559 to which it rose from Rs. 1,80,512 in 1912-13, and the average cost of each successful case was one anna and

eleven pies or two pies more than the year before. The increase is ascribed to an increase in the number of Deputy Sanitary Commissioners, improvement in the pay of the vaccination staff and increased expenditure at the lymph depôt.

Punjab.

104. The vaccination work in the Punjab during 1912-13 had shown a considerable rise in consequence of the prevalence of small-pox in the province. In that year the total number of vaccination operations numbered 1,032,847, but in 1913-14, the number fell to 887,469. Of the total 671,183 were primary cases and 216,286 revaccinations, against 710,994 and 321,853, respectively, in the previous year. The quality of the work in the year under review was not quite as good, the percentage of success in primary cases being 97·40 against 97·99 in 1912-13, and in revaccinations 71·07 against 73·50. Of the 28 districts there was a fall in the amount of primary work in 19 and a slight increase in the others. Decreases in revaccinations occurred in 19 districts, the Kangra district showing a fall of over 20,000 and Dera Ghazi Khan of over 19,000. Both these districts had shown a great excess in revaccinations in 1912-13. Great opposition to revaccination is still experienced in all parts of the province. House-to-house vaccination is not successful outside the very large towns. Dispensary vaccination was carried out in 7 districts, the number of primary cases being 2,404 and revaccinations 714.

The provincial Sanitary Commissioner suggests that every vaccinator should be given a thorough grounding in the technique of vaccination, the care of lymph, the preparation of registers and returns and the methods of checking birth and death registers. Further, that they should be put through a simple and practical course of hygiene, including the rudiments of village sanitation, disinfection, the cleansing of wells and methods connected with cholera, plague and malaria. The local Government has signified its willingness to consider specific proposals in the matter.

On an estimated birth rate of 40 per thousand of the population 67·42 per cent. of the children under one year of age were successfully vaccinated, compared with 68·06 in the preceding year. In municipalities where the Vaccination Act is in force, 78 per cent. of the available children were protected against 83 per cent. in 1912-13. In towns where the Act is not in force, the percentage was 69 against 70. The local Government remarks that these rates cannot be regarded as satisfactory and indicate that even where the Act is in operation, its provisions are not fully complied with, and expresses the hope that municipal authorities will realize more fully their responsibilities in the matter.

The vaccine lymph issued from the Punjab Vaccine Institute was on the whole of excellent quality. During the year 33,329 tubes were issued against 34,942 in the previous year. The insertion success reported was 95·17 per cent. in primary cases and 69·01 per cent. in revaccinations, rates corresponding to those in the previous year. It is said that the annual income from the sale of lymph now largely exceeds the working expenses of the Institute and may in time repay the capital and maintenance charges. Additions and improvements to the buildings of the Institute have been sanctioned.

The cost of the department was Rs. 1,33,731 to which it rose from Rs. 1,25,812 in 1912-13. The average cost of each successful case was two annas and ten pies against two annas and four pies in the previous year.

North-West Frontier Province.

105. With a total of 164,853 vaccination operations in the province during 1913-14, there was an increase of 12,113 on the figures of the previous year. Of the total 145,840 were primary cases and 19,013 revaccinations, showing an increase of 20,731 in the former and a decrease of 8,618 in the latter class of work. The results of the year's operations indicate that the people do not hesitate to accept vaccination, but regard revaccination as unnecessary and irksome. That the protection conferred is understood, is evidenced by an increase in the demand for the vaccinator's services where small-pox tends to become epidemic. As regards the quality of work the percentage of success in primary cases 99·01 was the same as in the previous year, but better in revaccinations, the rate of success being 91·22 per cent. against 88·88 per cent.

The total number of persons vaccinated in the Agencies and the Sherani country was 11,443 against 10,343 in 1912-13. No vaccination was done in the Amb State. In the Agencies, as in the province, the people exhibit no prejudice against vaccination, but do not understand the value of revaccination. At the request of the Nawab of Dir two vaccinators were deputed to his State but performed only 35 operations.

On an estimated birth rate of 40 per thousand of the population, 76·35 per cent. of the children under one year of age were successfully vaccinated, as compared with 62·85 per cent. the year before. In 5 out of 13 municipal towns the number of infants successfully vaccinated exceeded the number calculated to be available, and this is accounted for by the bringing in of children from outside and also to the unsatisfactory registration of births. Chloroformed glycerinated lymph was obtained, as usual, from the Punjab Vaccine Institute and gave satisfactory results.

The cost of the department amounted to Rs. 15,241 or Rs. 5 more than in 1912-13, and the average cost of each successful case was one anna and seven pies or one pie less than in the previous year.

Central Provinces.

106. The total vaccination operations in 1913-14 in the province, excluding the Feudatory States, showed a satisfactory increase on the number in the previous year, the figures being 622,376 and 574,510, respectively. In 1913-14 primary cases numbered 522,718 and revaccinations 99,658, against 503,956 and 70,554, respectively, in the previous year. Of the 22 districts, increases were recorded in 16 and decreases in 6. The larger increases in primary work occurred in Raipur (4,624), Amraoti (3,097), Bhandara (3,202), Wardha (2,438) and Chanda (2,265). The decreases except in Jubbulpore (2,237) and Saugor (1,776), were not noteworthy. There were decreases in revaccination in two districts only, *viz.*, Saugor (1,393) and Drug (397), while noticeable rises were recorded in Buldana (4,872), Amraoti and Chanda, over 3,000 in each, Betul, Yeotmal and Akola, over 2,000 in each. The general improvement is ascribed to the diminution of plague epidemics, an increase in staff and their emoluments in some districts, and also to interest evinced by district authorities.

The percentage of success in primary cases attained during the year was 97·85, and in revaccinations 65·11 per cent.; these rates are lower than in the previous year when they were 98·29 and 72·90, respectively.

The much needed scheme for improving the pay and prospects of the vaccination staff has been sanctioned. The scheme also provides for a general standard of education with a definite course of technical instruction in various duties connected with rural sanitation,—*e.g.*, epidemic duty and the checking of vital statistics.

On an estimated birth rate of 40 per thousand of the population, 73·14 per cent. of the children under one year of age were successfully vaccinated, as compared with 71·02 in the previous year. In municipalities 84 per cent. were protected: in the previous year the number of children successfully vaccinated exceeded the number calculated to be available. The Vaccination Act was withdrawn from all notified areas, but extended to three more municipal towns. The Act is now in force in 53 towns.

A central vaccine depôt has been opened temporarily in the Lunatic Asylum, Nagpur, but owing to limited accommodation, the preparation of lymph is restricted and only two districts could be supplied. The construction of suitable buildings is shortly to be undertaken. In the districts not supplied from the depôt, lymph was prepared locally. Only glycerinated lymph was used.

The cost of the department was Rs. 84,241 against Rs. 69,385 in 1912-13, and the average cost of each successful case two annas and three pies or two pies in excess of that in the previous year. The increase is due to increase of staff, the grant of local allowances to vaccinators in some districts and to the establishment of a vaccine depôt in the province.

Madras.

107. The decrease in vaccination work in the Madras Presidency in 1912-13 was made good during 1913-14, when a total of 1,677,696 operations were performed, against 1,586,344 in 1912-13, and 1,602,977 in 1911-12. The primary cases numbered 1,527,112 in 1913-14 against 1,461,790 in 1912-13 and revaccinations 150,384 against 124,554, both classes of work thus showing an improvement. The largest increases were recorded in Guntur (25,301), Vizagapatam (11,554) and in Ganjam, Malabar, Kistna, and Coimbatore, all with increases between 5,000 and 10,000. Decreases were recorded in three districts only, *viz.*, Tanjore (16,642), Chingleput (4,184) and Anantapur (712). The decreases in Tanjore and Chingleput are ascribed to the absence of small-pox, and in all three to the failure to appoint efficient substitutes for vaccinators on leave.

The quality of the work during the year also showed an improvement, the percentage of success rising to 91·8 from 88·4 in primary cases, and to 80·5 from 79·0 in revaccinations. The question of improving the personnel and pay of the subordinate vaccination staff is engaging attention.

The trial scheme under which both the registration of births and deaths and infantile vaccination are compulsory, was in force in the Chingleput district and in selected areas in the North and South Arcot and Madura districts. The introduction of the scheme throughout the Presidency has been abandoned by Government as "there are large areas in which its introduction would for the present be inadvisable." The Sanitary Commissioner, however, remarks

that until the compulsory registration of vital statistics and compulsory vaccination are in force throughout the Presidency, vaccination will not make any appreciable progress.

On an estimated birth rate of 40 per thousand of the population, 37·03 per cent. of the children under one year of age were successfully vaccinated, as compared with 34·36 per cent. in the previous year. In municipalities 74·29 per cent. of the available infants were protected against 73·5 per cent. in 1912-13.

From the Vaccine Section of the King Institute, vaccine was supplied for 1,972,165 cases against 1,887,639 cases in the previous year and was the largest quantity issued since the opening of the Institute. The supply to the Military Department was more than double that in the previous year. The bulk of the vaccine issued was in the form of lanoline paste. Glycerinated vaccine continued to be taken by Madras City and Colombo. The rate of success of the vaccine issued was, as usual, highest during the colder months, the rate in February attaining 96·36 per cent., falling to 81·61 in June, which was the lowest rate. With lanoline lymph the percentage of success in local fund areas rose to 91·5 from 88·0, and in municipalities to 95·2 from 92·7. The rate with glycerinated lymph also increased from 95·1 to 98·1 per cent.

The cost of the department was Rs. 3,37,686, to which it increased from Rs. 3,28,342 in 1912-13, and each successful case cost on the average three annas and eight pies which is three pies less than in the previous year.

Coorg.

108. The total number of vaccination operations in Coorg during 1913-14 was 13,666 against 13,073 in the previous year. There were 8,923 primary operations and 4,743 revaccinations. The quality of the work was better in the year under review, the percentage of success being 94·92 against 94·64 in primary work, and 87·00 against 81·98 in revaccinations.

On an estimated birth rate of 40 per thousand of the population, 11·10 per cent. of the infants were successfully vaccinated, as compared with 8·82 per cent. in 1912-13. In the two municipal towns of Mercara and Virajendrapet, the number of births during the year ending the 30th September 1913, was 145: of this number 106 were calculated to be available for vaccination, but the number of infants successfully vaccinated was 115. It must be assumed children from outside were brought in.

The cost of the department amounted to Rs. 2,898 against Rs. 2,876 in 1912-13, and the average cost of each successful case was three annas and seven pies against four annas and two pies in the previous year.

Bombay.

109. The increase in vaccination operations recorded in the Bombay Presidency in 1912-13 was further added to in 1913-14 when a total of 784,500 operations was performed. The number of primary cases closely approximated in the two years, being 711,115 and 711,222, respectively, but revaccinations numbered 73,385 against 70,948 in 1912-13. The increase in the latter was due to the prevalence of small-pox, but the provincial Sanitary Commissioner remarks that in spite of this, the average annual number of persons revaccinated in the past 3 years was only 71,003, a very small figure in comparison with the number of adults available: he adds that small-pox

will never be stamped out till the people understand the necessity for revaccination.

The percentage of success in primary cases was 98·73 and in revaccinations 55·86 as against 97·99 and 53·19 in 1912-13.

On an estimated birth rate of 40 per thousand of the population, 57·15 per cent. of the children under one year of age were successfully vaccinated against 56·43 per cent. in the previous year. In towns the number of children calculated to be available was 60,809 and the number successfully operated upon 67,195.

The majority of vaccinations were performed with glycerinated calf lymph manufactured at the Belgaum Vaccine Institute. During the year a total of 874,518 doses of vaccine were issued by the Institute against 775,587 in 1912-13. With the increased output, there was an improvement in the quality of the vaccine. The case and insertion success rates were 99·18 and 96·75 per cent., respectively, against rates of 97·95 and 93·85 in the previous year. The improved results are attributed to cold storage at the Institute. Calf-to-arm vaccination was carried out in the Presidency Circle, Karachi and the Kolhapur State, while human lymph was used in parts of Sind, the Kolhapur State and Kathiawar.

The cost of the department which had risen to Rs. 3,76,586 in 1912-13, fell to Rs. 3,63,910 in 1913-14. The average cost of each successful case was eight annas and nine pies or five pies less than in the previous year.

Burma.

110. The total number of vaccination operations in Burma, fell from 544,352 in 1912-13, to 518,468 in 1913-14. The primary cases numbered 426,177 and revaccinations 92,291, against 422,089 and 122,263, respectively, in the previous year. Thus it will be seen there was an increase in the former and a considerable decrease in the latter. In 21 of the 41 districts, primary cases showed an increase, the largest being in Kyaukpyu (9,224) followed by Pegu (8,220) and Akyab (8,187). On the other hand there were large decreases in some of the other 20 districts, notably in Amherst (9,928), Thaton (4,808), Minbu (4,733), Myingyan (4,157) and Magwe (3,917). In 17 districts revaccinations showed increases and decreases in the remainder: 6 districts recorded increases exceeding 1,000, while 13 showed decreases in excess of 1,000. The largest decreases were 9,595 in Rangoon and 5,930 in Mandalay. The large amount of revaccination work in the previous year was, however, due to the prevalence of small-pox.

The percentage of success in primary cases was 96·55 and in revaccinations, 65·31 per cent., the former approximating the rate of 96·69 in the previous year, while the latter was below the rate of 67·64 recorded that year.

On an estimated birth rate of 40 per thousand of the population, 21·11 per cent. of the children under one year of age were protected as compared with 20·10 per cent. in the previous year. In towns 93·55 of the available infants were successfully vaccinated, while in the previous year the number had exceeded that calculated to be available: this occurred in some individual towns during the year under review, and is explained in many cases by omissions in the registration of births.

Inoculation of small-pox virus occurred in several districts in connexion with outbreaks of the disease, some of which appear to have originated from the opera-

tion. In the Pegu district one inoculator, an ex-vaccinator, was convicted and 22 persons who had allowed themselves to be inoculated were prosecuted and fined. The Burma Prohibition of Inoculation and Licensing of Vaccinators Act, 1908, has not been extended beyond the Syriam, Insein and Pegu districts.

The outturn of work from the Vaccine Depôt at Meiktila has increased progressively. In 1913-14, the number of doses of glycerinated vaccine prepared was 806,360 which exceeded the record of 760,294 in 1912-13. The construction of a new laboratory and provision of a small refrigerating plant were sanctioned. The enlargement of the stables for calves and the conversion of the old laboratory building into a lecture room for apprentice vaccinators has been arranged for. During the year 36 apprentice vaccinators were trained against 32 in the previous year, and all but one obtained qualifying certificates.

The cost of the department amounted to Rs. 2,04,873, as compared with Rs. 2,05,199 in the previous year. The average cost of each successful case was seven annas and six pies or three pies in excess of last year.

Ajmer-Merwara.

111. The total vaccination operations in Ajmer-Merwara during 1913-14 increased to 15,292 from 13,942 in 1912-13. There were 15,260 primary cases and 32 revaccinations against 13,825 and 117 in the previous year. The percentage of success in primary cases was 98·05 as compared with 95·21 in the previous year.

On an estimated birth rate of 40 per thousand of the population, 60·90 per cent. of the infants were protected against 53·86 per cent. in 1912-13.

The cost of the department was Rs. 3,352 in 1913-14, as compared with Rs. 3,216 the year before, and the average cost of each successful case was three annas and nine pies or two pies less than last year.

Vaccination among troops.

112. Particulars of vaccination in the Army will be found in statement III, Appendix to Section V, of the Annual Report of the Sanitary Commissioner with the Government of India.

SECTION VI.

MEDICAL INSTITUTIONS.

(*Contributed by the Director-General, Indian Medical Service.*)

A.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private aided).

113. These institutions, at the end of 1913, numbered 2,820, an increase by 87 on the figure for 1912; and as in past years, the demand for the opening of more is felt in nearly every part of the country.

India.

Attendance continues to increase year by year; the in-patients numbered 515,662, an increase of 22,264, and the out-patients exceeded 30 millions. Taking both classes together the total amounted to over 30 millions, or more than a million in excess of the figures for 1912.

Expenditure during the year was £935,555, an increase of £31,106; Indian subscriptions amounted to £52,218, a slight improvement on the figures for the past two years.

The following tabular statement shows the main features of the operation of these institutions, during 1912 and 1913:—

Province.		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of Patients.	Number of Operations.
Delhi	1912	...	...	...	...	...
	1913	73	4,503	296,236	300,739	9,420
Bengal (excluding Calcutta) ...	1912	399	35,056	3,719,041	3,754,097	114,174
	1913	402	36,848	3,844,942	3,881,790	114,503
Calcutta	1912	15	27,856	310,066	337,922	36,113
	1913	15	29,436	313,796	343,232	35,661
Assam	1912	147	8,754	1,530,551	1,539,305	24,904
	1913	163	9,903	1,585,477	1,595,380	25,696
Bihar and Orissa	1912	195	30,203	2,073,073	2,103,276	126,860
	1913	197	30,010	2,136,182	2,166,192	101,509
Central Provinces	1912	168	13,926	1,697,344	1,711,270	45,702
	1913	173	14,075	1,660,905	1,674,980	47,622
United Provinces	1912	383	70,194	4,245,694	4,315,888	204,756
	1913	393	75,826	4,318,651	4,394,477	212,769
Punjab	1912	307	84,967	4,424,584	4,509,551	251,865
	1913	296(*a*)	85,198	4,505,979	4,591,177	250,261
Burma	1912	190	59,842	1,507,167	1,567,009	46,618
	1913	195	62,156	1,552,313	1,614,469	45,473
Bombay	1912	336	59,534	2,293,705	2,353,239	100,255
	1913	345	59,868	2,295,752	2,355,620	97,824
Madras	1912	516	85,371	6,119,400	6,204,771	238,734
	1913	549	87,220	6,418,778	6,505,998	253,484
North-West Frontier Province ...	1912	50	12,536	783,531	796,067	36,117
	1913	53	14,495	839,564	854,059	35,815
Baluchistan	1912	27	4,559	252,607	257,166	5,298
	1913	26	5,524	263,972	269,496	5,633
Total ...	1912	2,733	492,798	28,956,763	29,449,561	1,231,396
	1913	2,820	515,062	30,032,547	30,547,609	1,235,670

(*a*) Excluding Delhi.

Delhi.

114. There were 19 dispensaries open in the province at the end of the year, of which 5 were State-special, 10 Local Fund, 3 private-aided and 1 Railway. Particulars of the attendance, etc., at all these institutions during 1912 are not available.

There are separate isolation hospitals in the city and the civil station for the treatment of cases of infectious diseases.

The total expenditure was £10,208, towards which Indian subscriptions amounted to £110 only.

Bengal (excluding Calcutta).

115. The passing of the Bengal Medical Registration Act is one of the most important features of the year's work. An attempt has been made to limit hospital abuse by well-to-do persons who can afford to pay for medicines or to subscribe towards hospital upkeep.

Several itinerating dispensaries have been employed, and have treated large numbers of people. There is an increasing demand for dispensaries, and there are 20 now being built; nearly 12 per cent. of the population received treatment.

The question of supply of nurses in *mofussil* towns is under consideration; hitherto financial difficulties have prevented a satisfactory solution.

Total expenditure amounted to £68,195, of which sum Indian subscriptions covered £12,690.

Calcutta.

116. There is a continuous increase in attendance. The overcrowding in the Eye Hospital has become so marked that it has been decided to build a new one. The number of nurses has been added to, and the staff now consists of a Lady Superintendent, 4 senior sisters and 81 nurses. An electrical annex has been added to the Medical College Hospital, and several minor improvements have been carried out in all the Calcutta institutions.

Work has been commenced on the newly sanctioned School of Tropical Medicine, and it is hoped this institution will be in working order next year.

The maintenance charges grow yearly; the expenditure has now risen to £88,000, of which Indian contributions covered less than £1,000.

Assam.

117. There was a notable increase in the numbers treated, and 22·60 per cent. of the population obtained medical relief, as compared with 20·06 per cent. in 1911 and 21·8 in 1912. The system of supplying medical attendance at fairs continues to give very good results, the number so treated having risen from 94,330 in 1912 to 101,058. Difficulty is still felt in obtaining a sufficient number of sub-assistant surgeons, and it has been found necessary to increase the pay again. Efforts are being made to obtain more women doctors, but suitable candidates are not yet available for all the stations in which female medical aid is required.

The total expenditure amounted to £26,600, an increase of nearly £5,000; and towards this sum Indians contributed £1,600.

Bihar and Orissa.

118. The proportion of patients capable of supporting themselves while in hospital continues to rise and is now 13·10 per cent. of the whole. The number of out-patients continues to increase by about 4 per cent. annually. The demand for more dispensaries is being met as funds permit. The recently sanctioned increases in the rates of pay

of sub-assistant surgeons have not rendered the service as attractive as was hoped, and there is some difficulty in getting men of this class to enter the provincial establishment. To only a slightly less degree the same difficulty is found in the case of civil assistant surgeons.

Expenditure during the year amounted to £46,305, towards which Indians contributed about £11,000. These private contributions tend to rise every year, and are higher than in many other parts of the country.

Central Provinces.

119. The introduction of a system of payment for medicines among well-to-do out-patients is said to be responsible for the decrease in this class. The number of women and children attending for treatment continues to show a satisfactory increase. There are now 13 travelling dispensaries, and they are proving very successful in affording medical aid in remote parts.

There is still a great dearth of sub-assistant surgeons; men are not attracted by the present pay and prospects. It is not expected that this difficulty will be removed when the new Medical School is opened in Nagpur.

Financial assistance is still urgently required to bring most of the hospitals up-to-date in their equipment.

The expenditure during the year was about £42,000, and subscriptions from Indians rose to £6,000, a distinct improvement on the figures of earlier years.

United Provinces.

120. There are now 85 travelling dispensaries and the numbers treated by them exceeded 600,000,—double the corresponding figure for 1911. These dispensaries are supervised by Indian Medical Service officers detailed for the work.

The opening of the new hospital in connection with King George's Medical College has been an important feature of the year. It has already proved to be a most valuable addition to the medical institutions of the province.

New buildings at the King Edward VII Sanatorium for tubercle cases have provided accommodation for 47 patients. The condition of many large hospitals, as regards buildings, is improving yearly; but much remains to be done.

The total expenditure amounted to about £95,000, some £6,000 less than last year; Indian contributions were £9,500.

Punjab.

121. The figures for the year exclude those of Delhi which have hitherto been included in the Punjab report.

Progress has been satisfactory everywhere. The system of charging well-to-do patients for medicines employed is not popular; in one district only it is said to have been a success.

Increased attention is being paid to the provision of better facilities for medical aid to women, and it is hoped more female practitioners will be available in the near future now that the Ludhiana School of Medicine for women is being assisted by a Government grant. The training of midwives is now being carried out at four centres.

Fair progress has been made in improving existing dispensaries, but there is room for further advances in this direction.

The total expenditure was £86,000, and towards this amount Indian subscriptions contributed about £2,400.

North-West Frontier Province.

122. Three new hospitals have been opened and several others have been improved. There was an increase of nearly 60,000 in the number of cases treated. There has been a small addition to the cadre of assistant and sub-assistant surgeons, and the new provincial compounder service is said to be more popular than it was.

Expenditure was £15,600, an increase over that of last year of £2,000; Indians contributed only £135 to this amount. The Inspector-General considers too much is still spent on dieting, a charge which in many cases should be borne by the patients.

Baluchistan.

123. There were 36 against 38 dispensaries in 1912, two, at Bhag and Gandawa in the Kalat State, having been closed on the 30th April 1913, pending the re-organization of the State medical service. During the year important additions and improvements were made to hospital and dispensary buildings, and in some cases the location of a dispensary in a suitable building and on a prominent and accessible site has resulted in a marked increase in the attendance of patients. The total number of patients was 350,342, showing an increase of 8,418 compared with the preceding year. The expenditure amounted to £10,642.

Burma.

124. A scheme for the extended employment of travelling dispensaries is under consideration. In order to improve the nursing in hospitals where trained nurses cannot be provided, men of the compounder class are being specially instructed and employed as "ward assistants".

The number of admissions to hospitals and of out-patients continues to increase year by year. The opening of female dispensaries and better arrangements for treating women in civil hospitals has resulted in an increase in the number of women and children patients.

In Rangoon there has been a large increase in the number of gynæcological operations performed.

There is still a great dearth of sub-assistant surgeons, and the improved pay and prospects have entirely failed to attract men to the service.

Expenditure during the year was £110,794, towards which Indians and Burmans contributed about £1,600.

Bombay.

125. There has been a marked increase in the number of women and children attending general hospitals as in-patients (18 and 20 per cent., respectively). This is ascribed to improved nursing conditions. Attendance at female hospitals is also increasing rapidly.

The equipment of civil hospitals is being brought up-to-date as funds permit. There is still, however, need for more of these institutions, and especially for special wards for gynæcological cases and for the treatment of tubercle.

The total expenditure amounted to £155,000, towards which Indian subscriptions contributed only £943.

Madras.

126. The attendance has again increased markedly; during the past 3 years this increase has been 9 per cent. Women are coming forward far more freely for treatment than was formerly the case. It is considered that the number of in-patients would be still higher if suitable nursing could be provided. The number of midwives working under supervision among the population is now 385, and they attended 31,000 labours during the year. A better class of women is required.

The total expenditure amounted to £181,211, and Indian subscriptions to £5,234.

B.—Civil Hospitals and Dispensaries—(State-Special, Railway and Private non-aided).

127. The number of State-special and Railway hospitals and dispensaries has risen from 826 to 851, and of patients of all classes from 2,247,634 to 2,430,140.

The number of these institutions and of patients is as detailed in the following tables :—

State-Special and Railway Hospitals.

Province.		Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Delhi	1913	6	1,412	16,304	17,716	444
	1912	...	...	...	...	...
Bengal (excluding Calcutta)	1913	85	14,651	284,230	298,881	6,177
	1912	81	12,530	246,406	258,936	7,464
Calcutta	1913	2	3,166	4,814	7,980	221
	1912	2	3,604	4,493	8,097	392
Assam	1913	49	3,785	75,235	79,020	787
	1912	47	3,333	59,401	62,734	835
Bihar and Orissa	1913	77	5,295	181,328	186,623	5,410
	1912	67	4,512	161,109	161,621	5,185
Central Provinces	1913	63	3,259	143,162	146,421	2,464
	1912	70	3,336	131,925	135,261	2,263
United Provinces	1913	128	18,201	278,826	297,027	6,001
	1912	126	18,478	270,222	288,700	6,459
Punjab	1913	157	7,280	492,877	500,157	17,497
	1912	155	6,869	465,673	472,542	18,549
North-West Frontier Province	1913	27	8,777	111,030	119,807	3,313
	1912	27	7,418	122,877	130,895	3,235
Baluchistan	1913	8	1,796	52,299	54,095	1,132
	1912	8	1,837	54,195	55,996	945
Burma	1913	74	15,512	214,081	229,593	1,380
	1912	74	14,496	205,562	220,058	3,510
Bombay	1913	74	5,175	250,522	255,697	6,582
	1912	70	10,583	227,339	237,922	5,238
Madras	1913	101	9,862	227,261	237,123	5,176
	1912	99	10,354	205,118	215,472	4,613
Total ...	1913	851	98,171	2,331,969	2,430,140	56,394
	1912	826	93,350	2,154,284	2,247,634	58,688

Private, non-aided Institutions.

Province.		Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta)	1913	132	5,620	1,021,802	1,027,422	23,614
	1912	136	6,304	1,089,450	1,095,754	24,046
Calcutta	1913	2	...	4,570	4,570	224
	1912	2	...	4,822	4,822	189
Assam	1913	13	73	49,433	49,506	610
	1912	11	73	40,928	41,001	543
Bihar and Orissa	1913	65	8,292	722,765	731,057	21,064
	1912	66	8,403	697,913	706,315	21,681
Central Provinces	1913	36	1,318	139,648	140,966	2,522
	1912	32	1,490	124,347	125,837	2,293
United Provinces	1913	49	7,796	353,118	360,914	9,285
	1912	49	5,459	348,488	353,947	8,948
Punjab	1913	13	4,445	78,868	83,313	3,346
	1912	7	4,162	52,928	57,090	3,403
North-West Frontier Province	1913	7	2,201	72,229	74,430	10,593
	1912	7	1,811	63,884	65,695	12,292
Baluchistan	1913	2	104	26,647	26,751	436
	1912	4	138	28,624	28,762	926
Burma	1913	1	151	560	711	...
	1912	1	136	460	596	...
Bombay	1913	323	16,469	2,026,343	2,042,812	63,800
	1912	309	14,639	2,027,366	2,042,005	59,623
Madras	1913	54	10,783	332,374	343,157	15,145
	1912	45	9,184	295,171	304,355	13,476
Total ...	1913	697	57,252	4,828,357	4,885,609	150,636
	1912	669	51,799	4,774,387	4,786,186	147,420

C.—Lunatic Asylums.

128. The table below shows the strength of the Asylum population in 1913, and the statistics of sickness and mortality.

The population has risen by 422; and is now 8,472, as compared with 8,050 in 1912. The accommodation has not been increased in proportion to this rise; and, except in Bombay where the opening of the new asylum at Yeravda has relieved the congestion, most asylums suffer more or less from overcrowding. The number of deaths has fallen during the year from 776 to 673, a noteworthy improvement. The daily average sick rate has risen, but this is chiefly the result of more strictness in keeping sickly patients under observation in hospital. Tubercle still occupies an important position in the mortality returns; anti-tuberculosis

measures have been everywhere adopted, and it is hoped that the spread of the disease is being checked.

Province.		Number of Asylums.	Admitted and re-admitted during year.	Total Asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Criminal lunatics.
				Males.	Females.	Total.					
Bengal		3	213	1,057	220	1,277	86	93	1,084·51	109·11	596
Assam		1	74	245	58	303	14	23	242·75	39·06	100
Bihar and Orissa		1	90	291	53	344	19	41	275·08	17·69	137
United Provinces		3	368	1,256	357	1,613	160	104	1,275·00	156·29	298
Punjab		1	276	752	207	959	124	81	709·22	72·42	188
Central Provinces		1	91	292	79	371	31	20	299·98	7·08	90
Bombay		6	695	1,376	361	1,737	137	106	1,381·2	52·1	246
Madras		3	293	819	259	1,078	96	113	787·6	115·36	231
Burma		2	227	643	147	790	87	92	557·41	45·03	324
Total ...	1913	21	2,327	6,731	1,741	8,472	754	673	6,612·75	614·14	2,210
	1912	22	1,931	6,426	1,624	8,050	771	776	6,158·07	582·01	2,174

Bengal.

129. The decline in admissions was due to more harmless lunatics being handed over to their friends, instead of being placed in asylums. There was overcrowding in spite of additions to the accommodation. The year was unhealthy, and the constantly sick rate was higher than in 1912. The pay of the keepers at the Berhampore asylum has been improved.

Assam.

130. The increase in the number of tubercle cases continues; segregation sheds have been provided for treatment of this disease. The accommodation has been largely increased and there was no overcrowding.

Bihar and Orissa.

131. The asylum can now accommodate 306, but is still too small; a new female hospital and 50 cells are contemplated, and a segregation ward for tuberculous cases. The average number of sick was higher than in 1912, which was partly due to floods and to defective water-supply.

United Provinces.

132. There was no overcrowding, and the year was a healthy one. Arrangements have been made at the Agra asylum for accommodation of paying patients. More accommodation is urgently required for European patients.

Punjab.

133. There was a satisfactory decline in the daily average sick rate, from 111·87 to 72·42. Electric lights and fans are being introduced, and a block of quarantine cells is under construction. The difficulty of obtaining suitable keepers is still felt; a European warder has just been sanctioned. Cholera accounted for 2 deaths.

Central Provinces.

134. The year was a healthy one, and the death rate was only 6·67 per cent. Considerable structural improvements are being carried out. There was no overcrowding.

135. The new asylum at Yerayda has been completed, and accommodates 386 patients, and the Colaba and Poona asylums have been closed. There is difficulty in obtaining suitable warders.

Bombay.

136. Nothing noteworthy occurred during the year. An enquiry has been commenced in regard to the causation of "asylum dysentery". The increase in average number of sick is due to cases in which there are any intestinal symptoms being kept under observation in hospital.

Madras.

137. The mortality rate fell from 25·78 to 16·50 per cent. of the daily average strength, and the general health has improved. This is partly the result of an alteration in the dietary and partly to a general re-organisation of the system of treatment and employment of the inmates.

Burma.

D.—Medical Colleges.

There are 5 colleges which afford the course of instruction required for University degrees; 3 of these also train military assistant surgeons.

During the year the students numbered 2,080, or 209 more than last year, and consisted of 1,831 male civil, 148 military and 101 female pupils.

138. *Grant Medical College.*—There were 623 students on the rolls at the end of the year, of whom 43 were women. Of these, 22 were military, 48 were working for the L. M. S., 4 for the L. C. P. S., and the remainder for the M. B. examination. A chair of operative surgery has been instituted.

Bombay.

83 students, of whom 7 were women, obtained the L. M. S. diploma; 41 passed the M. B., B. S., 2 the M. D., and 1 the B. Hy.

139. The total number of students at the end of the year, including the apothecary druggist, sanitary and post-graduate classes, was 411, of whom 43 were women, and 36 military. A new system of examinations has been introduced, and the courses for the M. B., B. S., and L. M. S., are now the same, the marks obtained determining the nature of the qualification attained. 27 students obtained the L. M. S., 10 the M. B., B. S.

Madras.

It has been decided to remove the General Hospital and the College to a new site, but the buildings have not yet been commenced.

140. The students numbered 158 at the end of the year. 3 passed the L. M. S., and 18 the final M. B., B. S. The improvements to be carried out under the King Edward Memorial scheme will shortly be taken in hand.

Lahore.

141. At the end of the session there were 811 students, of whom 15 were women, 90 military. This is an increase of 80 on the figure for 1912. The number of applicants for admission was very large, 581; only 154 could be admitted. The Principal

Bengal.

considers the fees should be raised. 48 men and 3 women passed the M.B., and 2 men the M.D.; 13 military pupils qualified. There was no examination for the L.M.S.

More accommodation is needed.

142. The students in King George's Medical College numbered 83 at the end of the session. A new hostel has been opened for 3rd year students. The College has not been in existence sufficiently long for any of its students to obtain qualifications.

Lucknow.

E.—Medical Schools.

There are 15 medical schools which train civil, military and private pupils for the passing-out diploma. Of these one, "The Women's Christian Medical College" at Ludhiana, takes female students only.

The students numbered 2,126, or 50 less than last year. Lack of accommodation prevents the number of new students admitted in some of these institutions being more than a small proportion of the total number of applicants. Inadequacy of teaching staff is complained of in most of the schools; 346 students obtained the passing-out diploma, and the great majority entered Government service.

143. *Berry White School, Dibrugarh.*—The year closed with 112 students, including compounders. A class for "dhais" has been opened. 24 students passed the final examination for a diploma, and 15 compounders obtained the school certificate.

Assam.

The *post mortem* theatre has been completed.

There are now 11 boarding houses, each capable of accommodating 12 students.

144. *Rangoon Medical School.*—There were 32 students at the end of the year. 9 students (8 males and 1 female) passed the final examination.

Burma.

It is proposed to increase the hostel and lecture rooms. The staff of the school has been greatly strengthened, and the third and fourth years' subjects are taught by Indian Medical Service officers.

The class of Burman students now entering the school is improving.

145. *Campbell Medical School, Calcutta.*—The students numbered 248, of whom 13 were women; 73 appeared for the final diploma examination, and 47, of whom 2 were women, passed; 91 students of the compounder class passed the test.

Bengal.

A new anatomical theatre has been completed. There is great need for a hostel but funds are not available.

The teaching staff has been increased by the addition of 2 sub-assistant surgeons.

Dacca Medical School.—The students numbered 162 at the end of the year; 58 went up for the final diploma and 31 passed. Many improvements in the accommodation are required, but funds are not yet available to carry them out. 120 students of the compounder class went up for the special examination and 106 qualified.

The staff is inadequate, and at least three more teachers are required.

Bihar and Orissa.

146. *Temple School, Patna.*—Fortyfour students remained at the end of the year; 24 went up for the final examination and 19 obtained the diploma; 29 compounders obtained certificates.

The hospital (Bankipore) is being extended, a fresh water supply has been introduced into the school, and the pathology block is being enlarged.

The number of teachers has been raised from 5 to 8.

Orissa School, Cuttack.—There are 91 students including 6 women, a smaller number than last year; 28 went up for the final examination, and 14 obtained the diploma.

The staff was increased by 2 assistant surgeons, but more are needed.

More accommodation in the school, and a new hostel, are urgently needed.

United Provinces.

147. *Agra Medical School.*—The students numbered 184 at the end of the year, of whom 45 were women. There were 59 in the military class; 43 men and 14 women went up for the final examination and 33 men and 11 women passed. Certain improvements have been carried out in the male hostel; various new projects are under consideration.

Punjab.

148. *Lahore Medical School.*—There were 366 students at the end of the year, of whom 102 were military. There are 3 women; 58 went up for the sub-assistant surgeon diploma and 50 passed—19 women went up for the "dhais" certificate and 13 were successful.

Women's Christian Medical College, Ludhiana.—This institution is now State-aided. It trains sub-assistant surgeons, compounders and nurses, of which classes there were 27, 14 and 31, respectively, or 72 in all; 4 students appeared at Lahore in the final medical examination and all passed.

This institution ought not to be called a medical college. The term gives a false idea of its status. It is merely a medical school.

Bombay.

149. *Hyderabad School.*—The students numbered 86; 10 went up for the final examination and all passed. More teachers and an increase of accommodation are urgently needed.

Byramjee Jejeebhoy School, Poona.—There were 143 students at the end of the year of whom 38 were military; 22 went up for the final examination and 15 passed.

Byramjee Jejeebhoy School, Ahmedabad.—168 students were on the rolls, of whom 25 were military; 25 went up for the final examination and 20 passed. The staff has been strengthened by the addition of 3 private practitioners as teachers.

150. *Medical School, Royapuram.*—256 students remained at the end of the year of whom 38 were military and 114 private paying ones. The school is very overcrowded and further hostel accommodation is urgently needed. The staff is inadequate as there are only six instructors. 73 students went up for the final examination and 38 passed. The comparatively poor results are ascribed partly to the above mentioned defects and partly to sickness among the students.

Madras.

Medical School, Vizagapatam.—70 students remained at the end of the year, a larger number than ever previously. Many applicants for admission have to be refused on account of lack of accommodation. 13 students went up for the final examination and 9 passed.

Prince of Wales' Medical School, Tanjore.—The school year closed with 92 students, an increase on previous figures; 15 went up for the final examination and 12 passed.

F.—Annual Report of the X-Ray Institute of India, Dehra Dun.

151. Two classes of instruction were held during the year 1913, and were attended by 37 students in all. Of this number 34 passed the prescribed examination, 14 obtaining special proficiency certificates, and 3 failed to pass. The students included officers of both services (Civil and Military) Assistant Surgeons and Sub-Assistant Surgeons (Civil and Military).

The number of radiographic examinations made at the Institute during the year was 1,160. The number of cases of disease sent for treatment during the year was 80.

The small charging plants issued to Divisional Specialists are proving very satisfactory.

A branch installation at the Civil Hospital, Delhi, was opened on the 15th October. A similar branch installation at the Ripon Hospital, Simla, has been approved and will, it is hoped, be opened shortly.

SANITARY WORKS.

152. In paragraph 135 of the report for 1912, details are given of the non-recurring allotments made to local Governments for the improvement of sanitation during the years 1912-13 and 1913-14. No similar allotments were made for the year 1914-15, but a sum of Rs. 8,00,000 recurring was held in reserve for sanitation and allotments have been made from it during the year. The large grants already given exceeded the immediate spending power of local Governments, and it was estimated that on the 1st April 1915, the unspent balance from the special non-recurring grants would amount to £443,000, or 64·45 lakhs of rupees and they would also have at their disposal the recurring grants made for sanitation in March 1913. Provision was, however, made in the estimates of 1914-15 for recurring subventions of 6·25 lakhs to compensate local Governments for the loss entailed by the remission of certain contributions paid by local bodies for services performed on their behalf by officers of Government. During the year 1913-14 a non-recurring grant of Rs. 1,00,000 was placed at the disposal of the Government of the United Provinces for the improvement of the pilgrim route to Badrinath and Kedarnath. A further grant of Rs. 1,00,000 was made in 1914-15 towards the improvement of the water supply and sanitation on this route. A recurring grant of Rs. 20,000 was also made during 1914-15 for the sanitary and medical arrangements of the route. A non-recurring grant of Rs. 20,000 was also made to the Bombay Sanitary Association towards the cost of construction of a building to be used as a central institute, office and museum.

India.

In the Government of India, Department of Education, Resolution No. 888-908, dated the 23rd May 1914, dealing with Indian Sanitary Policy, it was pointed out that since the constitution of the Department of Education, the Supreme Government had made grants to local Governments and Administrations to the amount of Rs. 4,61,47,000 (£3,076,466) to meet the needs of sanitation in India. Of this sum Rs. 55,23,000 (£368,200) are recurring and Rs. 4,06,24,000 (£2,708,266) non-recurring. In addition, grants amounting to Rs. 82·33 lakhs (£548,866) a year have been made to district boards in certain provinces, a substantial portion of which will, it is hoped, be expended on rural sanitation.

In this connexion it may be mentioned that there is now a Sanitary Engineer in every province, except the North-West Frontier Province and Coorg, and in six provinces Deputy or Assistant Sanitary Engineers as well.

The following paragraphs contain information culled from provincial reports regarding sanitary works carried out or in progress in the several provinces.

153. The Imperial province appears for the first time in this section of the report. In the past Delhi has been included under the Punjab.

Delhi.

In the beginning of the year 1913, the Government of India sanctioned a sanitary grant of Rs. 5,00,000 to the Delhi municipality for sanitary works, out of which the following allotments were made: markets, Rs. 62,886; latrines on the water flush system, Rs. 38,130; water supply, Rs. 31,000; drains, Rs. 57,458; Nigambodh depôt, Rs. 31,526; miscellaneous sanitary proposals, Rs. 1,31,122.

In the municipal area several improvements were effected in the water supply, including an extension of the supply to the suburb of Subzimandi and the recharging of the filter beds. Monthly analyses of samples of water yielded uniformly satisfactory results. The whole of the conservancy arrangements were reorganised and great improvements effected. The number of incinerators in the city was increased and the incineration of night-soil and rubbish is being rapidly extended—several

new water flush latrines and urinals were built and the remaining *dalaos* for rubbish paved. Several extensions and improvements of the drainage were effected during the year. A complete survey of the levels of the city was undertaken with a view to drawing up a complete drainage and sewerage system for the whole city. Six new markets were opened and four more were under construction. An important sanitary work begun during the year was the paving and draining of the narrower gullies, a much needed improvement in the sanitation of the city.

In the district two *pucca* wells were constructed at a cost of Rs. 200 each by two Indian gentlemen at Bahadargarh Kanjhaola and Magbara Paik Saidpur, respectively.

Bengal.

154. During 1912-13 there were in the province, as in the previous year, 111 municipalities, excluding Calcutta, with an income, including the opening balance and extraordinary and debts of Rs. 93,22,039 against Rs. 78,08,730. The increase in income was Rs. 15,13,309, but the major portion consisted of sale proceeds of Government securities, withdrawals from savings bank, loans from Government and advances. Of the total receipts (the figures in brackets are for the previous year), 32·21 (36·15) per cent. was spent on sanitary works, original and recurring; 6·51 (7·82) per cent. on roads; 3·73 (4·36) per cent. on public safety and 37·82 (28·21) per cent. on all other requirements. The total municipal expenditure during 1912-13 on sanitary purposes was Rs. 36,09,497 against Rs. 34,33,598 the year before, the total increase being Rs. 1,75,899. The only two heads under which there was increased expenditure were water supply (Rs. 3,30,674) and treatment of sick (Rs. 6,785), while there was decreased expenditure under seven heads, by far the largest being under conservancy (Rs. 1,01,781) and markets and slaughter houses (Rs. 39,584). The large increase under water supply was due chiefly to the construction of the Hoogly-Chinsurah and Kurseong water works and improvements to the Howrah works; the decrease under conservancy was due to smaller expenditure in connexion with the Darjeeling sewage scheme, now nearing completion, and also to heavy expenditure in the previous year at Dacca for improvement of the conservancy tram line.

The expenditure during the year on sanitary works carried out by Government, Municipalities, District Boards and private persons was Rs. 13,14,368 compared with Rs. 12,30,769 in 1911-12. The chief items of expenditure were Rs. 3,79,360 on the Hoogly-Chinsurah water works, Rs. 64,956 on the construction of drains in Howrah, and Rs. 60,403 for improvements to buildings in the Darjeeling bazar.

In regard to sanitary schemes and projects, the Sanitary Engineer's Department furnishes a separate report for the first time. The department is no longer under the control of the Sanitary Board. The department was strengthened during the year by the appointment of an additional Assistant Engineer. From the report the following is culled.

Sketch projects for water supplies were drawn up, or were under preparation, for 12 places, the largest of these being, Krishnaghar (cost Rs. 1,57,000), Midnapore (two schemes costing Rs. 3,13,000 and Rs. 3,38,000, respectively), Rampur Boalia (two schemes, cost varying from Rs. 4,15,000 to Rs. 5,20,000), Chandpur (Rs. 1,11,900). Detailed water supply schemes were prepared for five towns, and one for Chittagong (cost Rs. 3,50,000) was prepared by the Municipal Engineer in consultation with the Sanitary Engineer. Ten schemes were in course of construction during the year and of these the Jessore water works were practically completed,

the Serampore and the Pirojpur works and South Suburban extension being actually completed. Regular analyses were made of the water of all water works by the Sanitary Commissioner.

Of sewerage schemes the preparation of that for Cossipur-Chitpur was taken up in anticipation of approval. The Dacca scheme, to cost 22 lakhs, was adopted by the municipality, which proposes to ask for a Government grant to carry out the urgent portions of the scheme, estimated to cost Rs. 8,58,000. The Darjeeling sewerage scheme was practically completed.

For surface drainage schemes, sketch projects were in course of preparation for 15 towns, and detailed drainage projects prepared for two. Progress was made with 11 drainage schemes under construction: of these the works at Garulia were completed during the year and almost completed at Berhampore.

Sanitary Board.

155. The constitution of the Board was changed during the year. It no longer controls the work of the Sanitary Engineer. The Board was strengthened by the appointment of three non-official members: only one ordinary and one special meeting were held. Four water supply and three drainage schemes were considered during the year.

Assam.

156. Owing to the creation of two municipalities and one union, and the conversion of a union into a municipality, there were at the end of 1913, 14 municipalities, 4 unions and 1 station. Their total income, including the opening balance, amounted to Rs. 6,66,390 against Rs. 6,60,258 in 1912. The expenditure on sanitation fell to Rs. 3,04,769 in 1913, from Rs. 4,43,907 the year before, and is explained by the decrease of Rs. 1,50,377 under water supply, due to the purchase in 1912 of materials for the overhauling of the Shillong water works and the construction of new water works at Jorhat. The percentage of expenditure on sanitation was 35·7 in 1913 against 57·4 in 1912. The percentage of income spent on sanitation varies greatly in the several municipalities, Shillong alone spending between 50 and 60 per cent.; 4 spent between 40 and 50 per cent., 3 between 30 and 40, 2 between 20 and 30 and 8 below 20 per cent. It is considered that the expenditure on conservancy is in many cases far below the reasonable minimum; this is due to an absence of appreciation of the importance of the matter. The question is to be placed before the Sanitary Board for a decision as to the minimum expenditure on conservancy per head of population to be accepted as adequate.

For sanitary improvements during 1913-14, a sum of Rs. 2,25,000 was provided. Of this Rs. 1,01,610 was allotted to various purposes, the largest grant of Rs. 17,153 being for the construction of a cholera hospital at Dhubri: this is the first port of call in Assam for the daily service of river steamers which carry a large number of passengers and immigrants. Grants of Rs. 12,893 for sanitary improvements at Hafflong, Rs. 11,060 for metering water supply house-connections in Gauhati, Rs. 8,000 for village sanitation and Rs. 5,500 for re-organisation of the conservancy system at Silchar were the other chief allotments.

Among water works schemes are: (1) a supply for Cachar at an estimated cost of Rs. 1,32,768, sanction to the detailed estimate of which is awaited pending a report as to how the municipality propose to meet the recurring charges; (2) for Sylhet, a scheme to cost Rs. 2,00,000 has been submitted for administrative approval, but a

decision has not yet been arrived at as to how the municipality can meet the maintenance charges and the annual payment towards the loan that will be necessary ; (3) preparation of a rough project, amounting to Rs. 55,450 for the improvement of the Dhubri water supply by the introduction of a pipe supply, to be obtained from a well under sub-artesian conditions ; (4) preparation and submission of a rough project to cost Rs. 1,00,000 for a pipe water supply for Tezpur ; (5) preparation of an estimate for a pipe water supply for Dibrugarh the cost of which is Rs. 1,66,000 ; (6) the Jorhat water works which are approaching completion and (7) the overhauling of the Shillong water works which has been finished. Regular analyses show the exceptional purity of the water of the last named.

Among other sanitary works, the conservancy arrangements of Cachar have been thoroughly revised, and an estimate of Rs. 19,200 has been prepared to effect an improvement in the present unsatisfactory conservancy arrangements in Sylhet. Estimates were under preparation for a general drainage scheme for Kamrup, and for Dibrugarh a combined drainage and town improvement project was prepared. A rough project for providing a sewerage system for Shillong was prepared and submitted to Government. This scheme is estimated to cost Rs. 11,00,000 and is so framed that sections complete in themselves can be taken up as funds are available.

The expenditure of Local Boards on sanitation amounted to Rs. 89,397, the largest sums being spent by the Gauhati and Barpeta Local Boards, where comprehensive schemes of water supply are in progress.

157. The constitution of the Board was the same as in the previous year.

Sanitary Board.

Three meetings were held, a large portion of the work being conducted by the circulation of files. The function of the Board is mainly advisory, but during the year it distributed grants-in-aid of rural water supplies to the extent of Rs. 40,000. Such grants are, however, not in future to be placed at the disposal of the Board.

The most important question before the Board was the formulation of a general scheme for the improvement of rural water supply. Type plans and instructions for the construction of tanks and wells were drawn up and issued to all local authorities. At the close of the year the Board had under consideration schemes for water supply for eight towns, a drainage and town improvement scheme for Dibrugarh, drainage schemes for three towns, conservancy schemes for two, town planning for one, a rural water supply scheme for each sub-division, a malaria research scheme, and the Shillong sewerage scheme.

158. The creation of a new municipality during the year, raised the total number of municipalities in the province to 55. Their expenditure on sanitary works during 1912-13 amounted to Rs. 8,68,190 against Rs. 8,29,345 in the previous year. Increased expenditure was incurred under the heads conservancy and markets, but less under water supply and drainage. District Boards spent Rs. 1,83,381 on sanitation during 1912-13 against Rs. 2,19,532 in 1911-12. The expenditure on drainage showed a decrease of about Rs. 40,000.

Bihar and Orissa.

From the Imperial grant for sanitation, Rs. 8,46,176 was allotted, leaving a balance of Rs. 1,97,824. The largest allotments were Rs. 3,00,000 for the Patna water works, Rs. 1,24,000 for the Bhagalpur water works and Rs. 1,00,000 each

for improvements to the Arrah water works and the Muzaffarpur sanitary improvement scheme.

Two first class and 8 second class health officers were appointed to municipal towns and a training school for sanitary inspectors was opened at Bankipore with a year's course of instruction. During the year a local Sanitary Conference was held at Ranchi, and later a Conference assembled at Bankipore to consider the question of school hygiene.

Sanitary Board.

159. The Board constituted in August 1912 was reconstituted in May 1913, with a view to accelerating work. The Board is composed of the Hon'ble Member of Council in charge of the Medical and Sanitation Branches, as President, the Chief Engineer, Public Works Department, Irrigation Branch, the Financial Secretary to Government, the Sanitary Commissioner and the Sanitary Engineer, as members, the last named being also the Secretary to the Board. Seven meetings were held during the year. The inadequacy of the Sanitary Engineering staff hindered work, but it is expected that services of an Assistant Sanitary Engineer will soon be available. The total value of work involved on water works and drainage projects in the province amounts to Rs. 1,41,23,368.

The projects prepared under the supervision of the Sanitary Engineer amounted to a total of Rs. 63,76,940. Eight sketch projects for water supply were under preparation by the Sanitary Engineer during the year, the largest of these being for Patna City, to cost Rs. 13,50,000. The projects for Deogarh (Rs. 2,41,000), Ranchi (Rs. 9,80,000) and Hazaribagh (Rs. 4,35,000) have been shelved indefinitely for financial reasons. In addition 6 sketch projects were prepared outside the Sanitary Engineer's office; 4 detailed water supply projects were prepared and one was under preparation.

During the year the Gaya water works (cost Rs. 6,00,000) and the Monghyr water works (cost Rs. 4,66,171) were completed and opened.

As to sewerage schemes, the following were prepared—Bankipore (estimated cost Rs. 4,68,192) and Patna University (estimated cost Rs. 3,67,500), while a project for Muzaffarpur is under preparation (estimated cost Rs. 4,25,000). The Gaya sewerage scheme is under construction, Rs. 5,88,670 having been spent of the estimated cost of Rs. 6,80,000. Construction work on drainage projects of 7 towns was in progress during the year, chief of these being Puri (cost Rs. 1,75,831) and Monghyr (cost Rs. 2,22,242).

During the year type plans and estimates for minor water works for small communities were prepared by the Sanitary Engineer and circulated to local authorities. Five other type plans were prepared and recommended by the Sanitary Board for adoption.

United Provinces.

160. In 1912-13, the municipal income was Rs. 88,85,859 compared with Rs. 90,10,297 in the previous year. The expenditure on water supply (Rs. 16,28,192), drainage (Rs. 8,26,961) and conservancy (Rs. 15,29,969) totalled Rs. 39,85,122, against Rs. 32,14,112 in 1911-12; the increase occurred under all three headings. The expenditure represents 45 per cent. of income against 36 per cent. in the previous year.

Information as to expenditure on village sanitation is not furnished in the provincial sanitary report. The scheme of village sanitary *panchayets*, to encourage village sanitation by villagers themselves, introduced in selected villages, was continued during the year. So far the scheme is said to have met with doubtful success, except in the Meerut district. The experiment is, however, to be continued for another year.

As regards sanitary works the year was one of considerable activity. The Government of India made a special grant of Rs. 15,25,000 for urban sanitary works and of this, a sum of Rs. 12,29,500 was allotted. The largest allotment was of Rs. 1,35,000 for the Benares water works, followed by grants of Rs. 1,00,000 each for experiments in tube wells at Cawnpore, the Hardwar water works, and the Benares drainage works: in addition there was one allotment of Rs. 81,500, one of Rs. 75,000 and eight of Rs. 50,000 each. A special grant of Rs. 52,000 was made for the improvement of the Agra water works. Of the recurring grant of 5 lakhs made by the Government of India, to which was added the balance of Rs 58,469 from the previous year, Rs. 5,22,997 was distributed up to the end of the year. Among the allotments were Rs. 1,00,000 for rural sanitation, Rs. 25,000 for the free distribution of quinine, and Rs. 34,000 for the inquiry into malaria; other items do not call for comment.

Final sanction was accorded to 10 schemes, the largest of which were the Muttra drainage scheme (cost Rs. 2,99,368) in connexion with which the Municipal Board propose to carry out concurrently a water supply scheme for which a special grant of Rs. 75,000 has been made by Government; the Allahabad filtered water supply improvements (Rs. 2,90,538); Allahabad unfiltered water supply (Rs. 1,49,961); and the Agra water works improvement (Rs. 1,34,363). Schemes are under preparation for 16 towns—four of them for water works and the others for drainage.

For the closer supervision of water works in the province and to secure economical working, an Assistant Engineer was appointed for their inspection and control. To secure cheap water supplies it is proposed to utilise tube wells and trial borings have been commenced at four places. The demand for water where there are water works increased considerably: the quality of the water supplied was in all cases excellent.

Sanitary Board.

161. The Board held ten meetings during the year. Its functions are to advise local bodies in sanitary matters and to examine and approve projected schemes. During the year the Board recommended for sanction, schemes, the estimated cost of which amounted to Rs. 12,34,834. Of these four were for water supply, eight for drainage and five for other works. Proposals were considered for 11 works which were entered on the programme of works to be undertaken by the Sanitary Engineer, while several others after consideration were deferred for want of further particulars or because in need of revision.

Punjab.

162. The provincial report does not afford particulars of the income of municipalities and the expenditure on sanitation. The year under review was, in the words of the local Government, "one of special activity in sanitary matters and the demands on the Sanitary Department showed a steady increase in frequency and importance". Again,

"efforts to improve the sanitation of towns and villages have received a marked stimulus from the recent generous grants-in-aid". As a result of the provincial Sanitary Conference held during the year, it has been possible for the local Government to fix and define a sanitary policy. Resolutions were issued in respect of rural sanitation and the creation of a service of health officers and sanitary inspectors in municipal towns. Questions of policy have necessarily to be subordinated to financial considerations, but still the Sanitary Board was able to distribute Rs. 1,93,475 to local bodies during the year, and grants were made by Government aggregating Rs. 14,00,000. Administrative sanction was accorded to schemes of the estimated cost of Rs. 22,58,276, and technical sanction given to water supply and drainage schemes, involving an expenditure of Rs. 5,91,375.

Among the chief sanitary works under construction was the Chair water supply extension works in Simla, estimated cost Rs. 5,75,587, with a further extension estimated to cost Rs. 16,300. In addition to minor works completed or in hand by the Municipal Committee in Simla, is the extension of the sewage mains, estimated cost Rs. 61,000, with which good progress was made, nearly two-thirds having been completed during the year. A detailed scheme, amounting to Rs. 2,22,000, for an underground sewerage system for part of Amritsar city was worked out and is under the consideration of the Municipal Committee. The work of "*dhab* filling", for which an estimate of Rs. 1,50,000 was sanctioned in 1911, is nearing completion. At Lahore the important scheme for an underground water-borne sewerage system for the city at a cost of Rs. 15,50,000, was administratively sanctioned, the local Government giving a grant-in-aid of Rs. 9,00,000. The intramural drainage scheme at Rawalpindi, to cost Rs. 1,69,397 sanctioned in 1912, made good progress, a sum of Rs. 1,34,200 having been spent up to the close of the year under review. Sanction has been accorded to the Sialkot water supply scheme, estimated to cost Rs. 4,59,357, and a good start was made An extension to the Lyallpur water works estimated to cost Rs. 1,14,000, is contemplated. The drainage scheme at Fazilka in the Ferozepore district, estimated to cost Rs. 70,000, was satisfactorily completed during the year.

In connexion with the source of water supply from tube wells, tests of the relative merits of certain tubes have been under the observation of the Sanitary Engineer and it is expected that it will be possible to pronounce, fairly confidently in most cases, what is the best form of strainer and whether the sub-soil from which a supply is to be derived is suitable. Various sanitary works under construction and those completed were inspected by the Sanitary Engineer or his Personal Assistant and inspection notes sent to those concerned.

Sanitary Board.

163. There was no change in the constitution of the Board during the year. Four meetings were held. Of the grant of Rs. 1,50,000 placed at the disposal of the Board during 1913-14, Rs. 1,49,070-8-0 was allotted up to the end of 1913, the largest sum being Rs. 29,636 to the Gojra water supply, followed by grants to the Amritsar conservancy tram line (Rs. 17,000); Maghiana drainage (Rs. 14,884); filling depressions at Jandiala (Rs. 12,391); and Amritsar water works (Rs. 11,000). The Board approved and submitted to the local Government 14 schemes, which included the Lahore sewerage scheme (cost Rs. 15,61,800); Multan water works (Rs. 3,56,320); and Multan drainage (Rs. 2,75,000).

The annual grant to be placed at the disposal of the Board in future has been increased to Rs. 3,00,000.

North-West Frontier Province.

164. The Government grants for sanitation during the year 1913 were Rs. 2,00,000 non-recurring, and Rs. 1,00,000 recurring. Of the total, Rs. 2,03,000 was allotted for water supplies and the balance for other sanitary works. The chief allotments were Rs. 50,000 each for water supplies at Kohat and Bannu, Rs. 20,000 each for drainage and paving at Bannu and drainage at Abbottabad, and Rs. 45,000 for paving, draining and flushing at Dera Ismail Khan. The Chief Medical Officer remarks that the larger of the grants were made with a view to enable municipalties to cope with the first and most essential need of a sufficient unadulterated water supply. The grant of Rs. 1,06,000 for sanitary works in Peshawar, sanctioned in the previous year, has not yet been expended: the sanitary problem of the station is a difficult one, and requires the services of an expert specialist to prepare a comprehensive and progressive programme.

Exclusive of establishment charges, municipalities and notified areas expended from their own revenues a sum of Rs. 1,07,521 on sanitary measures.

During the year a small sanitary service was inaugurated, consisting of a Deputy Sanitary Commissioner, one health officer of the 1st class, one of the 2nd class and four of the 3rd class.

Central Provinces and Berar.

165. The total income of municipalities for 1912-13, excluding opening balances and loans, was Rs. 32,26,353 against Rs. 26,46,530 for the previous year, and including loans, etc., the amounts were Rs. 36,99,910 and Rs. 34,07,623. Of these amounts 43 per cent. was spent on sanitation, which includes 24 per cent. spent on water supplies and drainage. Up to the end of 1913, Government grants for water, drainage and town improvements and extensions amounted to Rs. 2,33,358.

Much was done during the year to improve the sanitary conditions of towns, and the programme of sanitary projects is a comprehensive one. The following is culled from the report of the provincial Sanitary Engineer.

Ten detailed projects, of a total estimated cost of Rs. 41,00,000, are now with municipal committees who are elaborating the financial proposals. Chief among these are—Jubbulpore drainage project, cost 9½ lakhs; Amraoti water supply, 8½ lakhs; Akola water supply, 6½ lakhs; the Arvi and Damoh water supplies, 4 lakhs each. Sanction was accorded to the Arvi and Akola water supply projects and also to the Buldana water supply (half a lakh) and the Harda drainage scheme (2 lakhs). In each case Government gives a grant equal to half the cost of the work, and also pays the supervision and establishment charges. Work was pushed on by the contractors in the extensive Nagpur city sewerage system and on the Wardha surface drainage project, both mentioned in the report for 1912. Construction work was also carried out in connexion with the water supplies of Amraoti (both city and civil station), Hinghanghat, Raipur, Nagpur, Bhandara and Burhanpur. Investigations were made for new water supply schemes for 8 towns and for extensions to existing supplies of 2 others. The Sanitary Engineer was unable for want of staff to do any work in connection with drainage projects, but the deficiency was made good by a firm of consulting engineers, who satisfactorily prepared drainage projects for 9 towns.

Pari passu with town sanitation, progress is being made with sanitation in villages: the matter is one which requires to be approached gradually and on broad principles. During the year a special grant of Rs. 60,000 was given for village water supplies. In this connexion it may be mentioned that there is an annual allotment from provincial revenues for the improvement of *ryotwari* villages and this is almost all spent on water: the allotment in 1912-13 was Rs. 55,052 and in 1913-14 it was Rs. 67,625. All the allotment was, however, not expended.

During 1913, there were 80 villages under the Village Sanitation Act: their aggregate income was Rs. 1,60,532 and expenditure Rs. 1,14,540; of the latter only Rs. 3,739 was spent on water supply. "Town Fund" and other villages managed by mukaddams had an income of Rs. 92,662, of which only Rs. 2,032 was spent on water. In villages under District Councils Rs. 76,416 was spent on the construction and repair of wells and tanks. A definite scheme for improving the water supply in villages has been prepared.

166. The reconstitution of the Board has, it is said, given a marked impetus to the sanitary branch of municipal administration. Action is being taken under the advice of the Board to extend town limits, open out suitable markets, introduce building bye-laws, adopt standard designs for latrines, wells, pumps, meat-markets, slaughter-houses, etc. The Board held three meetings, and accomplished a considerable amount of work.

Sanitary Board.

167. There were 63 municipalities in the Presidency during the year: two major unions were constituted municipalities, but one of them was not under the operation of the Municipal Act till after the close of the year. The income of these bodies is not stated in the provincial sanitary report, but it is mentioned that the assignment for expenditure on sanitation was 46·6 per cent. of income, which is less than the percentage of 67·7 per cent. spent in the previous year. The explanation suggested by the provincial Sanitary Commissioner for the lower expenditure is the liberal grants made by Government which admitted of the diversion of municipal funds to other purposes.

Madras.

The number of District Boards remained the same as in the previous year, and their allotment for sanitation was 9·2 per cent. of income against 8·2 per cent. in 1912. The expenditure during the nine months ending 31st December 1912 was 51 per cent. against 45·2 per cent. in 1911.

There are now 23 municipal towns provided with water supply schemes. Schemes have been sanctioned for 1 town and are under investigation for 16 others: improvements to 11 existing schemes are also being investigated.

As to drainage, Ootacamund continues to be the only *mofussil* municipality with a comprehensive drainage scheme: proposals for its improvement are under consideration. Elsewhere progress is slow, except in Madura and Vellore where sanctioned schemes are under execution. Schemes for 29 towns are, however, under investigation.

In towns without a piped water supply the chief sources of supply are wells, tanks, rivers and irrigation channels. Encouraged by liberal Government grants,

municipal councils have endeavoured to secure as pure a water supply as possible. The question of sewage disposal is said to be very unsatisfactory and in need of speedy remedy. Sewage farming was in force in 18 municipalities as compared with 21 in the previous year, but it is said little improvement was noticeable, either financially or otherwise, in most of them. In three cases only were the farms worked as profitable concerns.

The opening out of congested areas and providing extension sites made but slow progress owing to the hesitation of municipal councils to adopt radical measures, and also owing to the various stages of unpreparedness in which schemes were submitted. During the year rules were prescribed for the laying out of extension sites and the construction of huts and sheds : bye-laws were also prepared to regulate the construction of buildings to be adopted by local bodies with such modifications as local conditions require.

As regards sanitary works, the report of the Sanitary Engineer reviewed in the last report was for the financial year 1912-13. A further change was made, and in future the report is to relate to the calendar year. To adjust the change, the report now under review relates to the nine months ending 31st December 1913. The sanctioned programme of work for the Sanitary Engineer was (1) the preparation of detailed plans and estimates for 17 major schemes, and (2) the investigation of 28 major schemes. Of the former 12 relate to water works and 5 to drainage, and of the latter 23 to water works and 5 to drainage. Of the plans and estimates prepared the following may be mentioned.

Madura water works extension.—The plans and estimates, amounting to 19 lakhs submitted in 1912 were returned for revision. Revised plans were prepared, for a supplementary and experimental pumping scheme to cost Rs. 5,68,000, and 10 lakhs to follow if the experimental part of the scheme be successful. *Anantapur water supply.*—A pumping scheme, to cost 2 lakhs for a water supply from a coarse sand layer in the deep bed of the Pandamaneru river. *Vizagapatam water works improvements.*—Proposals to supplement the existing supply, to cost one lakh. *Guntur water works improvements.*—Scheme to supplement the existing insufficient supply, to cost Rs. 1,09,120. *Cuddalore water supply.*—Pumping scheme, to cost Rs. 7,66,000. *Bellary water supply.*—To cost 11 lakhs. *Tinnevelly, Palamcottah and Tuticorin joint water supply.*—The pumping scheme for a joint water supply for the three towns, to cost 31½ lakhs was abandoned. An independent scheme for Tuticorin alone was worked out, to cost 15 or 18½ lakhs according to the nature of the material of the pipe delivery main for the first 18 miles. *Ootacamund drainage improvements.*—Plans and estimates for the provision of a new cast-iron main sewer, to cost Rs. 2,60,000. *Adoni drainage.*—Scheme to cost about 2½ lakhs. *Salem drainage.*—Plans and estimates aggregating about 4 lakhs expected to be completed in 1914-15.

In connexion with the question of improving the rural water supply in places subject to yearly epidemics of cholera, it has been decided to carry out experiments on a large scale for the protection of village wells and fitting them with suitable pumps. A commencement was made in 6 districts with a grant of Rs. 15,000 for the purpose to each. The results do not yet justify a pronouncement as to the probable success.

168. A non-recurring grant of Rs. 25,000 was made by the Government of India in 1912-13 for sanitary works in Mercara, but not being sufficient was supplemented by an additional grant of Rs. 15,000

Coorg.

The laying out of the Coronation Garden was completed, and in the Gowli Bazar congested parts were opened up. Six model quarters and cattle sheds were built and a swamp running through the middle of the bazar was drained. The draining of swamps round Mercara was in progress. The estimates for the improvement of the water supply of the town have been approved, and the work is to be carried out during the year 1914-15.

169. There was no change during the year in the number of city and town municipalities in the *mofussil* which remained at 157. Their total income amounted to Rs. 1,09,75,326 as compared with Rs. 1,16,36,120 in 1911-12. The expenditure on public health, such as water supply, drainage and conservancy, amounted to Rs. 38,61,355 against Rs. 32,15,212 in the previous year. Including expenditure on improvements to water supplies and drainage, the municipal expenditure on public health was Rs. 8,15,472 in excess of the sum spent in the previous year.

Bombay.

There were 25 District Local Boards and 214 Taluka Local Boards during 1912-13, against 25 and 212, respectively, in 1911-12. The former incurred an expenditure of Rs. 78,28,268 against an income of Rs. 76,34,897. Of the expenditure, Rs. 4,33,611 was on account of water supplies and drainage and Rs. 30,295 on other improvements. The Taluka Local Boards expended Rs. 13,91,070, of which Rs. 12,35,859 was on civil public works.

In addition to an Imperial allotment of Rs. 7,00,000 for sanitary works, the local Government also made certain allotments. The Imperial grant was, as in the preceding year, mainly devoted to the improvement of water supplies, village sanitation and the maintenance of dispensaries, roads and bridges, and the provincial grant was for improvements to village water supplies exclusively. The total grant made by Government during the year amounted to Rs. 27,09,740. The principal allotments were Bombay Improvement Trust for slum improvements (experimental), Rs. 4,00,000; Ahmedabad water supply, Rs. 3,74,000; Jalgaon water supply, Rs. 3,50,000; Ahmednagar water supply, Rs. 3,20,000; drainage of civil lines and Frere Town Quarters, Karachi, Rs. 2,00,000; Poona drainage and water supply, Rs. 1,75,000; Barsi water supply, Rs. 1,50,000; and minor sanitary improvements at Poona, Rs. 1,00,000. It is mentioned that the expenditure from the allotments made is not available, as no separate accounts were maintained, the grants being amalgamated with the general revenues of the Boards concerned: when the expenditure exceeds the allotment, any excess is made good from local funds and public contributions.

During the year sanction was accorded to 7 new projects, 35 were in progress and 19 were under consideration. Deputy Sanitary Commissioners completed sanitary surveys on a uniform plan of 47 towns and villages. With regard to these the remarks of the Deputy Sanitary Commissioner, Sind Registration District, may be repeated. "There are very few towns in the province for which such reports have not been made, and although the reports were drawn up on the general sanitary requirements of each town, rather than with a view to any one special sanitary scheme, they should nevertheless be sufficient to indicate to the district officer both the choice of the town for a sanitary scheme and the most desirable direction for a scheme in the town selected". A reference to Collectors on the work of village Sanitary Boards and

Committees, showed that the majority consider that the Committees are doing good work in keeping their villages clean, but the work is hampered by lack of funds.

Sanitary Board.

170. The Board was reconstituted during the year. It is now composed of the Commissioner, Central Division, as President, with the Secretaries to the Government, General and Public Works Departments, the Sanitary Commissioner, one non-official gentleman and the Sanitary Engineer as members: the last mentioned is the Secretary to the Board.

The Board held four meetings, to consider among other matters, water supply and drainage schemes, and the distribution of a grant of Rs.1,00,000 placed at its disposal.

Seven projects were sanctioned by Government during the year, *viz.*, Ahmednagar water supply, Rs. 7,51,521; improvements to the Barsi water supply, Rs. 4,73,087; Sangli water supply, Rs. 2,96,862; Nandurbar water supply, Rs. 2,18,000; Ahmedabad water supply extension, Rs. 8,98,918; Hyderabad water supply, Rs. 37,679; Jalgaon water supply, Rs. 29,070. Of the water supply works in progress or completed during the year, the following remarks are taken from the Board's report:—

Bijapur.—Practically completed, cost Rs. 1,06,288. *Poona.*—Settling tanks and high-level service reservoir completed and laying cast-iron mains therefrom in progress, cost Rs. 4,41,135 (combined water and drainage scheme). *Ahmednagar.*—Work in progress, cost Rs. 1,31,381. *Nasik.*—Work completed, cost Rs. 65,642. *Karachi.*—Extensions completed, cost Rs. 4,97,821.

Projects for numerous new works and improvements to existing water supply and drainage schemes were under consideration and preparation, but want of adequate establishment hampers work.

For artesian water supplies a large number of bores were in progress. Of three completed, only the one at Kharagoda was successful. The pumping tests in the Dholka sub-artesian supply were successful and a water supply scheme from this service is under preparation.

The appointment of a Mechanical Engineer, who inspected the pumping plant and machinery of the majority of the water works in the Presidency and Sind, has proved very successful.

An itinerant analyst was appointed in September 1913 to carry out bacteriological tests of water. The appointment promises to prove very valuable.

Burma.

171. Of a total income of Rs. 1,77,88,160 during 1912-13, the various municipal and local bodies spent Rs. 53,91,334 on sanitary works: of this 12 lakhs was spent on water supply against 14 lakhs the year before; 9 lakhs against 6½ lakhs on drainage; and 14½ lakhs against 13½ lakhs on conservancy: 18 lakhs were spent on other sanitary works.

The Government of India made a non-recurring grant of 10½ lakhs, of which Rs. 50,000 was for the improvement of the provincial vaccine depôt. The balance of 10 lakhs was for expenditure on urban sanitary works spread over three years. Of this grant, Rs. 1,88,382 was distributed during the year 1913-14, the largest allotment Rs. 64,000 being to Mandalay in connexion with the water works: Rs. 26,000 to

Maymyo for improvements to the septic tank, and Rs. 40,000 to Kalaw (Southern Shan States), half the amount being for a water supply scheme and half for sanitary measures. The Imperial Government increased the recurring grant to 6 lakhs, and from this the following were the principal allotments—Drainage schemes: Akyab (Rs. 50,000), Prome (Rs. 62,930), and Maymyo (Rs. 73,100)—Water supply schemes: Maymyo (Rs. 46,485), Yamethin (Rs. 91,793), and Monywa (Rs. 88,794).

During the year, the Sanitary Engineer drew up water supply schemes for seven towns and drainage schemes for four. Of these the most important were the revised water supply scheme for Pegu to cost Rs. 4,14,961, and the drainage schemes for Akyab and Moulmein to cost Rs. 4,90,546 and Rs. 4,16,104, respectively. The water supply schemes of Yamethin, Pyinmana and Kalaw are all estimated to cost over a lakh each, and the Maymyo drainage scheme over a lakh and a half. Of bazar schemes for five towns, three were completed and two in progress during the year: 14 bazar schemes and 2 drainage schemes were examined and reported on.

Sanitary Board.

172. There were eight meetings of the Divisional Sanitary Boards during 1913, one each at Maymyo, Monywa, Henzada and Kindat and two each at Moulmein and Pegu. At each matters of local interest were discussed.

Military Works.

173. During the year 1913-14, the expenditure on ordinary military works rose to Rs. 96,09,218 from Rs. 86,17,716 in the previous year, and that on special military works demands to Rs. 39,67,463 from Rs. 31,98,947.

Particulars regarding new works and improvements in some of the more unhealthy stations will be found in Tables IV and XVII*.

*Standard Tables of the Sanitary Commissioner's Annual Report.

SECTION VIII.

GENERAL REMARKS.

174. *The Central Research Institute.*—Considerable additions and improvements to the buildings of the Institute were effected during the year. A new teaching laboratory for the bacteriological class and suitable accommodation for the malaria section have been provided. The Institute acted as the head-quarters of the numerous inquiries that have been undertaken by the Indian Research Fund Association and served a most useful function as the source of supply of much of the apparatus and equipment of these inquiries.

Laboratories.

The routine examination of material such as Widal, Wasserman tests and determination of opsonic index of blood, the microscopical examination of blood, bacteriological examination of discharges, etc., examination of tumours, and the bacteriological examination of water, entailed a very considerable expenditure of time and labour, and the demand for such showed a very appreciable increase over that of the previous year. Altogether 1,483 such specimens were examined.

Four classes of instruction in bacteriological methods and technique were held during May, June, July and August, and were attended by 18 officers of the Indian Medical Service, 2 officers of the Royal Army Medical Corps and 8 Military Assistant Surgeons.

The work of the Serum and Vaccine Therapy Section is also increasing in amount. The manufacture and issue of the chief anti-sera were about equal in amount to that of the previous year, but the demand for vaccines showed a very material increase. The increase was chiefly due to the supply of 18,000 doses of anti-typhoid vaccine for the use of the Indian Army. The total output of this vaccine was 23,000 doses.

The Malaria Section is housed in Kasauli, but in addition it has a field laboratory in Delhi where two classes of instruction were held in March and September, respectively. Each class extends over six weeks and instruction is given in malaria technique and field work and in the methods of carrying out a malaria survey. At these classes 17 officers of the Indian Medical Service and Royal Army Medical Corps, 8 civil doctors and 33 members of the Indian Subordinate Medical Department underwent instruction. The amassing of information regarding malaria conditions in India is making considerable progress. A very complete malaria survey of the Imperial enclave at Delhi was carried out, an account of which is published in the *Indian Journal of Medical Research*, Volume II, No. 2.

Much work has been done on the identification of mosquitos and a collection of several thousand specimens is maintained in the Bureau. Some valuable collections of foreign anophelines and culicines were received in exchange during the year. A complete set of Indian anophelines was sent to the Ghent Exhibition. The malaria reference library has been considerably increased, thanks to a grant made by the Indian Research Fund Association. Assistance has been rendered to malaria workers in all parts of India.

Bombay Bacteriological Laboratory.—During 1913, 795,637 doses of anti-plague vaccine were sent out as compared with 727,377 in 1912, and 789,350 the average annual out-put for the years 1909-12. The increase on the previous year's demand was occasioned by an increase in the amount sent to countries outside India. The number of doses issued for use in India was less than in the previous year : this was probably due to the fact that 1913 was a somewhat milder plague year than its predecessor. The Director's annual report quotes numerous statistics, all showing the marked protection that inoculation with the vaccine as now prepared confers on the inoculated.

The routine work of the laboratory occupied most of the time of the staff but some useful research work was carried out, notably an investigation into the potency and suitability of hydrocyanic acid gas as an anti-plague disinfectant, and an inquiry into guinea-worm disease. Experiments with regard to the former have not been completed : as far as they go, they demonstrate that the gas is both efficient and safe when carefully handled. The guinea-worm inquiry emphasizes the wide distribution of the infection in India and confirms the usually accepted view with regard to the rôle played by cyclops as an intermediary host. The monkey, *Macacus sinicus,* appears to be immune to infection. A man who was successfully infected developed signs of the disease, *i.e.,* appearance of the adult female worm at the surface of the leg, 348 days after swallowing infected cyclops. Potassium permanganate, even in high dilution, is lethal to cyclops.

Some observations were made on the value of tincture of iodine in the treatment of bubonic plague. Given by the mouth the drug appears to be of some value : the observations were too few to justify any very definite conclusions being drawn.

An inquiry on the subject of tuberculosis in Bombay emphasises the extreme rarity of bovine tuberculosis in India. An inquiry into the prevalence of diarrhœa in Poona was carried out by a member of the laboratory staff. Evidence was adduced that contamination of the water supply of Poona was chiefly, if not entirely, responsible.

Further observations were made on the treatment of leprosy by means of a vaccine prepared from the streptothrix isolated by Major Williams, I.M.S. : the results obtained were not convincing of the therapeutic value of the remedy.

Popular lectures and demonstrations on the cause and prevention of the more common tropical diseases were given to 320 High School teachers and students. Special demonstrations were given to the Bombay Sanitary Inspectors' class and to fifth year students of the Grant Medical College. An exhibit, illustrating the distribution, cause, prevention and treatment of bubonic plague was prepared and despatched to the Ghent International Exhibition.

The King Institute of Preventive Medicine, Madras.—This consists of a Vaccine Section and a Microbiological Section. The work carried out in the former is referred to in Section V of this report. In the latter a considerable amount of research work was carried out. The systematic bacteriological examination of samples of water from four experimental filters, two sand filters and two mechanical filters—the Jewell and the Patterson—which had been erected in the grounds of the Institute, involved a very large amount of work. This work is still in progress and the final results are awaited with interest.

With the object of obtaining data for the better classification of bacteria found in water supplies, one hundred organisms were isolated from the filtrates of each of the above mentioned filters and their reactions studied. A paper on the subject was published by Major J. W. Cornwall in the *Indian Journal of Medical Research*, Volume II, No. I.

Pathological specimens sent to the laboratory for examination and report were in excess of those of the previous year and totalled 4,029. The number of doses of vaccines of various kinds sent out was 7,087 against 3,004 in 1912—of the former number 1,396 were autogenous vaccines, the remainder being stock vaccines. An inquiry was made into the etiology of the dysentery that was prevalent in the Madras Lunatic Asylum. The disease was found to be of bacillary type.

Major Patton and Captain Cragg who were on the staff of the Institute, published their text book on Medical Entomology and contributed several interesting papers to the *Indian Journal of Medical Research.*

An interesting research by Majors Cornwall and Patton on the salivary secretion of biting insects was commenced (see *Indian Journal of Medical Research*, Volume II, No. 2).

Pasteur Institute, Kasauli.—During the year 1913, 3,980 persons underwent anti-rabic treatment as against 3,548 in the previous year. Of this number 48 succumbed to hydrophobia: 29 of these died more than fifteen days after completion of treatment and so constitute the so-called failures of treatment. The percentage failure rate (·72 per cent.) was thus slightly higher than in 1912 when it was ·56. The mortality rate for Indians was 1·3 per cent. as against 1·46 in 1912. For Europeans it was ·4 (2 deaths). This difference between the two races is a constant one and is due to the fact that amongst Europeans treated, the wounds inflicted are often of a very trivial character—much more trivial than are seen amongst the Indians who present themselves for treatment.

A considerable amount of research work was done at the Institute. Quinine and phenol, which certain recent American reports have proclaimed as being of value in the treatment of rabies, were tried both in men suffering from hydrophobia and in rabid animals. The treatment appears to be of no avail.

Attempts to grow the rabies virus upon artificial media were continued. It was found possible to keep the virus alive on such media for six weeks but it was not possible to subculture it.

A large amount of research work was done on the treatment of snake-bite and also on the halteridium parasite of the pigeon. Papers on these subjects have been published in the *Indian Journal of Medical Research.*

The Pasteur Institute of Southern India, Coonoor.—In 1913, 1,293 patients underwent anti-rabic treatment, as against 1,240 in the previous year. Of this number 3 died of rabies during treatment, 3 less than fifteen days after completion of treatment, and 14 more than fifteen days after treatment was completed. This latter number—the failures of treatment—represents a failure rate of 1·08 per cent.

The research work carried out dealt chiefly with rabies and the prevalence and etiology of elephantiasis in Cochin.

Sanitary Conference.

175. The Third All-India Sanitary Conference was held in Lucknow in January 1914, under the presidency of the Hon'ble Sir Harcourt Butler, Member of the Governor-General's Council, in charge of the Education Department, and was attended by 119 delegates. All the local Governments, Hyderabad, Mysore, Ceylon and Portuguese India, were represented. The proceedings lasted nine days. The subjects discussed covered a very large range. A total of 90 papers were presented to the Conference for discussion.

Visits of inspection were paid by the Conference to Hardwar, Benares and the Magh Mela at Allahabad.

The following resolutions were passed by the Conference :—

RESOLUTIONS.

Proposed.	*Adopted.*
1. That in view of the reported success in mitigating malaria which has attended methods of *colmata* and *bonificazione* in Italy, and the probability that such methods would have similar results in certain parts of India, further investigation of the subject is desirable both in Italy and in suitable localities in India, and that as a preliminary measure a small expert committee consisting of one medical officer and one engineer should, if possible, be deputed to Italy under the auspices of the Indian Research Fund Association.	1. As proposed.
2. That in view of the resentment to which, under present conditions in India, hasty or energetic interference with everyday sanitation in villages is likely to give rise, progress in rural sanitation must be slow : that it is essential to secure the cooperation of the public before any real advance can be made; that in consequence attention should be devoted, for the present, mainly to (*a*) the extended use of tube wells, where feasible, in school compounds and at places of concourse, such as markets, fairs, thanas, kutcherries, *etc.* ; (*b*) the provision of travelling dispensaries; (*c*) the teaching of elementary hygiene in schools; (*d*) the instruction of midwives; (*e*) the constitution of village sanitary committees; and (*f*) the appointment of health officers for rural areas.	2. That it is desirable to study rural sanitation, and to push forward such schemes as are practicable, and that special attention should be devoted, for the present to (*a*) the extended provision of protected water supply in school compounds and at places of concourse, such as markets, fairs, thanas, kutcherries, *etc.*; (*b*) the provision of travelling dispensaries; (*c*) the teaching of elementary hygiene in schools; (*d*) the instruction of midwives; (*e*) the constitution of village sanitary committees; (*f*) the appointment of health officers for rural areas; (*g*) the construction of model villages laid out on sanitary principles in a few selected localities; and (*h*) the extension of village sites in congested districts wherever necessary.

Proposed.	*Adopted.*
3. That the medical inspection of schools and scholars, special attention to the hygienic condition of schools, the provision of play-grounds, etc., are eminently desirable from the point of view of public health.	3. As proposed.
4. That the results which have been obtained in Delhi, demonstrate the importance of efficient scavenging and the proper disposal of night-soil and refuse, especially stable litter and organic matter, in the neighbourhood of the house, with a view to the mitigation of the fly nuisance and the consequent relief from much of the discomfort, and many of the dangers, to which the public are exposed.	4. That the attention of all municipalities and local authorities be drawn to the danger to health due to the presence of flies, and that every attempt should be made towards introducing more stringent regulations and methods for the prompt collection, removal and disposal of refuse, especially stable litter and other organic matter, in the neighourhood of dwelling houses.
5. That with regard to the very high rate of infantile mortality in all parts of India, but especially in the larger towns, it is desirable to emphasise the necessity of educating the mothers and *dhais*, and as a means of dealing with this problem, to draw attention to the encouraging results which have attended the employment of nurse district visitors in Bombay and Madras.	5. As proposed.
6. That an accurate knowledge of the distribution and causation of sickness and death is of supreme importance as the foundation on which all schemes of sanitary improvement should be based, and that, therefore, the collection, compilation and tabulation of vital statistics should be considered one of the chief duties of every health officer, whether of a district or a municipality.	6. That an accurate knowledge of the distribution and causation of sickness and death is of supreme importance as the foundation on which all schemes of sanitary improvement should be based, and that, therefore, the collection, compilation and tabulation of vital statistics should be considered one of the chief duties of every health officer whether of a district or of a municipality.
That, under present conditions in India, most people die without having been attended in their last illness by competent medical men, and that in consequence the impracticability of compulsory notification must be accepted for the time, but that voluntary notification should be encouraged wherever possible.	

Proposed.	*Adopted.*
7. That the present prevalence of tuberculosis in India is such as to demand serious attention and special measures for dealing with it: that one or more officers should be placed on special duty to study in detail the distribution of the disease, to investigate the causes underlying it and to organise methods of diffusing information on the subject; also that great circumspection should be exercised before instituting, at considerable cost, further Tuberculosis Sanitoria; in this country such institutions have an educational rather than a therapeutical value.	7. That the present prevalence of tuberculosis in India is such as to demand serious attention and special measures for dealing with it; that officers should be placed on special duty to study in detail the different problems affecting tuberculosis in India, to investigate the causes underlying it, and to organise efforts towards the diffusion of information on the subject, and measures for the prevention of infection; also that circumspection should be exercised before instituting, at considerable cost, further Tuberculosis Sanatoria. What are now really required are inexpensive buildings modelled after the homes of the people, so as to have greater educational value.
8. That special attention be directed to the serious danger arising from the present indiscriminate use of tuberculin by medical practitioners not possessing the requisite special experience.	8. That serious danger arises from the indiscriminate use of tuberculin by medical practitioners not possessing the requisite special experience.
9. That with reference to proposed legislation for the regulation of food and drugs in India, it is necessary that chemical standards of purity for milk and milk products should be established; that European standards are not applicable, and that, therefore, further investigation to obtain suitable standards, and also information as regards the methods of detecting the various adulterants, is desirable.	9. As proposed.
10. That in order to prevent the adulteration of milk which is now practically universal in India, improvements in the production and distribution of milk are urgently necessary, but that in view of the present high price of this commodity and the fact that any further increase would seriously affect poor consumers, it is essential that organisation should precede restriction, and that there should be mutual help and co-operation between sanitarians, the milk dealers and the Agricultural Department.	10. As proposed.

Proposed.	*Adopted.*
11. That all municipalities which have not already done so, should introduce satisfactory building and drainage bye-laws and make adequate arrangements for enforcing them, and that if any municipality fail to take action, higher authority should be empowered to compel them to do so.	11. As proposed, with the addition of the word "water" after "building".
12. That it be suggested to local Governments that (*1*) the preparation and execution of town-planning and housing schemes; and (*2*) the acquisition of land in process of development in the neighbourhood of growing towns, are legitimate objects of municipal expenditure.	12. As proposed.
13. That compensation for the acquisition of buildings which are unfit for human habitation should be limited to the value, with no addition on account of compulsory acquisition.	13. That compensation for the acquisition of residential buildings which are declared by competent authority to be unfit for human habitation, and the sites on which they stand, should be limited to the value awarded with no addition on account of compulsory acquisition.
14. That the progress of sanitation is greatly impeded on all sides by the want of sanitary engineers.	14. That the progress of sanitation is greatly impeded on all sides by the want of sanitary engineers, and that the establishment of sanitary engineers should be placed on an adequate basis to meet the demands for the design and execution of sanitary works.
15. That the results obtained have already established the value of carefully carried out malaria surveys which have in several instances brought to light important and unexpected facts regarding the causation of malaria in particular localities.	15. That the papers read at the Conference have again established the value of carefully carried out malaria surveys which have, in almost every case, brought to light important and unexpected facts regarding the causation of malaria in particular localities.
16. That although under certain circumstances rice cultivation may be extremely dangerous, there appears evidence that many rice growing districts are extraordinarily free from malaria, and as the reasons for this are still imperfectly known, it is most important that this subject, which was emphasised by the Conference at Madras, should receive continued close attention.	16. As proposed, with the addition of the word "extensive" before "rice growing districts, etc."

Proposed.	*Adopted.*
17. That in view of our knowledge of malaria prevention, it is of first importance that efficient screening be provided for all bungalows of persons who are working in hyperendemic or dangerously malarious areas.	17. As proposed.
18. That it would be helpful if all Indian workers, following the example of the British Museum authorities, would, for purposes of classification, include all anophelines under the genus *Anopheles*.	18. As proposed, except that for "all Indian workers" was substituted "workers on malaria in India," and for "classification" the word "nomenclature".
19. That the additional evidence before the Conference emphasises the facts (*1*) that villages infected late in one plague season probably play an important part in carrying over infection to the following plague season; (*2*) that it is possible to identify those villages and deal with them in such a way as to prevent or postpone a recurrence of the disease; and (*3*) that results of great value would be obtained by an experiment on a large scale with well organised schemes of rat destruction carried out during the quiescent period and before the onset of the following epidemic.	19. That the importance of active anti-plague measures during the off-season should be emphasised. That the method suggested in Captain Kunhardt's paper for selecting the villages to be operated on, is of considerable value, but should be supplemented by careful personal inquiries amongst village communities. That systematic rat destruction is the best plan of campaign. That further investigations into the manner in which plague is carried over from one epidemic season to another in different infected areas, should be strongly recommended.
20. That further investigation is necessary on the subject of the etiology of beri-beri.	20. Withdrawn.
21. That attention be invited to the discussion on the method of raising revenue to defray water charges, and more particularly to the opinion expressed therein that model bye-laws for the assessment of water-rates might with advantage be drawn up, where not already in existence.	21. Withdrawn.
22. That the following list should be added to the subjects selected at the Madras Conference for treatment:—(*1*) latest types of sewage disposal works suitable for small and large communities in India; (*2*) prevention of dust on roads; (*3*) statistics of sedimentation and filtration of water; (*4*) prevention of waste in water supply; (*5*) method of sinking deep bores (for water supplies or other purposes); (*6*) run-off from large and small catchment areas.	22. As proposed.

Proposed.	*Adopted.*
23. The Engineering Section of the Conference repeats the recommendation made at the Madras Conference, that there should be a Joint Secretary for the Engineering Section of the Sanitary Conference.	23. "That there should be a Joint Secretary for the Engineering Section of the Sanitary Conference".

The proceedings of the Conference have been published in five volumes as supplementary numbers of the *Indian Journal of Medical Research.*

The Indian Research Fund Association.

176. The investigations that have been prosecuted directly under the auspices of the Association are detailed below together with the names of the officers in charge of each inquiry.

Cholera	Major E. D. W. Greig, C.I.E., I. M. S.
Dysentery	Captain J. Cunningham, I. M. S.
Goitre	Major R. McCarrison, I. M. S.
Kala-azar in Assam	Major F. P. Mackie, I. M. S.
Kala-azar in Madras	Mr. V. T. Korke.
Plague prevention	Major J. C. G. Kunhardt, I. M. S.
Pharmacology of cinchona derivatives.	Major A. C. MacGilchrist, I. M. S.
Bacteriological examination of water supplies.	Captain J. Morison, I. M. S.
Leprosy	Lieutenant-Colonel A. Gwyther, I. M. S.
Tuberculosis	Doctor A. Lankester.
Flies	Mr. P. R. Awati.

In addition to the above, much financial and other assistance has been given by the Association to numerous other researches, notably to several experimental anti-malaria schemes.

Papers dealing with the results hitherto obtained in many of the above mentioned inquiries have been published in the quarterly *Indian Journal of Medical Research*, of which seven numbers have appeared. The Journal is the property of the Research Fund. The gratifying reception that has been accorded to it is evidence that it is fulfilling a useful purpose.

Bacteriological Department.

177. During the year 1914 the cadre of the Bacteriological Department was increased by the addition of fifteen new appointments.

Sanitary Policy.

178. In May 1914 the Government of India issued a comprehensive resolution dealing with Sanitary Policy in India.

Table No.				PAGES.
I.—EUROPEAN TROOPS.—Summary.—			Sickness and Mortality by Geographical Groups.	118-119
II.—	„	„	Ratios of Armies	120
III.—	„	„	„ „ Geographical Groups	121
IV.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	122
V.—	„	„	Statistics of Officers.—Sickness and Mortality among Officers of British Army.	123
VI.—INDIAN TROOPS.—Summary.—			Sickness and Mortality by Geographical Groups.	124-125
VII.—	„	„	Ratios of Armies	126
VIII.—	„	„	„ „ Geographical Groups	127
IX.—PRISONERS.—Summary.—			A.—Sickness and Mortality by Administrations.	128
	„	„	B.—Sickness and Mortality by Geographical Groups.	129
X.—	„		Ratios of Administrations	130
XI.—	„	„	„ Geographical Groups	131
XII.—GENERAL POPULATION.—			Provincial Birth and Death Statistics ...	132
XIII.—	„	„	Births	133
XIV.—	„	„	Deaths	133
XV.—	„	„	„ in Towns and Rural Circles ...	134
XVI.—	„	„	„ according to Age	134
XVII.—	„	„	„ „ „ Cause	135
XVIII.—	„	„	„ by months	136
XIX.—	„	„	Ratio of Deaths according to months ...	136
XX.—	„	„	Deaths from Cholera, by Provinces, 1882—1913	137
XXI.—	„	„	Deaths from Cholera, by months, in 1913 ...	138
XXII.—	„	„	Details of distribution and occurrence of Cholera in 1913.	138
XXIII.—	„	„	Mortality from small-pox	139
XXIV.—	„	„	„ „ Fever	140
XXV.—	„	„	„ „ Dysentery and Diarrhœa ...	141
XXVI.—	„	„	„ „ Plague	142
XXVII.—	„	„	„ „ Respiratary Diseases ...	143
XXVIII.—	„	„	Vaccination	144

TABLE NO. I.—*Summary, Sickness*

Groups.	Years.	Average strength*.	Constantly sick.	Invaliding.	RATIO PER A.—ADMISSIONS D.—DEATHS			
					Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1903-1912	1,231	51	8·5†	4·1	...	...	·08
	1912	1,195	39	4·2	...	...	...	...
	1913	1,156	40	10·4	...	...	...	...
„ II.—Burma Inland	1903-1912	1,808	48	2·6†	1·6	...	1·4	1·11
	1912	1,207	34	3·3	...	...	...	...
	1913	1,237	38	1·6	...	...	...	...
„ IV.—Bengal and Orissa	1903-1912	1,852	52	7·9†	11·8	...	·6	·43
	1912	1,978	29	10·1	...	...	·5	...
	1913	1,924	43	7·8	...	...	...	...
„ V.—Gangetic Plain and Chutia Nagpur	1903-1912	6,527	45	9·6†	5·4	...	1·0	·63
	1912	5,897	28	7·3	6·3	...	·3	·17
	1913	5,973	29	8·0	·2	...	·3	...
„ VI.—Upper Sub-Himalaya	1903-1912	13,650	46	8·0†	7·9	...	·4	·33
	1912	13,430	31	6·9	7·2	...	·4	·22
	1913	13,397	31	8·7	2·1	...	·1	...
„ VII.—North-Western Frontier, Indus Valley and North-Western Rajputana.	1903-1912	5,040	47	9·6†	37·5	·02	·3	·30
	1912	5,505	32	7·4	3·4	...	...	...
	1913	5,461	32	4·8	1·6	...	...	...
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1903-1912	6,015	49	9·4†	5·2	...	·1	·08
	1912	5,923	33	10·5	5·1	...	1·0	·68
	1913	5,917	31	9·1	5·7	...	...	...
„ IX.—Deccan	1903-1912	10,519	42	5·8†	2·1	...	·5	·35
	1912	11,664	28	6·5	1·9	...	·4	·17
	1913	11,175	27	9·2	1·6	...	·1	·09
„ X.—Western Coast	1903-1912	1,514	50	9·4†	2·1	...	·1	...
	1912	1,509	37	8·6	4·0	...	...	...
	1913	1,455	34	12·4	·7	...	...	...
„ XI.—Southern India	1903-1912	3,549	50	9·2†	4·0	...	·1	·03
	1912	3,276	28	4·3	19·9	...	...	...
	1913	3,411	20	4·4	1·2	...	...	...
„ XII (*a*).—Hill Stations	1903-1912	11,498	35	5·9†	5·3	...	·3	·16
	1912	12,014	22	5·8	2·2	...	...	...
	1913	12,228	22	6·9	7·6	...	...	...
„ XII (*b*).—Hill Convalescent Depôts and Sanatoria ...	1903-1912	3,686	58	10·6†	2·3	...	·2	·11
	1912	3,362	39	6·8	1·7	...	...	...
	1913	3,612	41	9·1	...	...	...	...
India	1903-1912	70,863	44	7·6†	7·2	·00	·4	·35
	1912	71,001	29	6·7	4·5	...	·3	·14
	1913	70,755	81	7·5	2·7	...	·1	·01

* The decennial ratios are worked on the total strength of the ten year period.

† From 1909 to 1912.

and Mortality by Geographical groups.

MILLE OF STRENGTH.

FROM

FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All Causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·5	...	1·9	·41	89·9	·57	137·0	·08	1·3	·24	20·9	1·54	188·3	·16	878·7	8·77
...	...	...	...	76·2	...	226·8	·84	·8	..	·8	...	77·8	...	719·7	9·20
...	...	...	...	43·3	...	18·2	...	1·7	...	·9	...	116·8	·87	609·9	6·92
...	...	3·9	1·11	111·9	·61	69·0	...	1·2	·44	8·4	·33	166·1	·11	807·6	7·35
...	...	...	...	55·5	·83	47·2	...	1·7	...	9·1	...	10·7	...	553·4	1·66
...	...	...	...	105·9	...	10·5	...	3·2	·21	1·6	...	124·5	...	629·2	·81
·7	·05	4·7	·65	134·8	·27	72·1	...	3·6	·92	15·8	·49	187·9	·11	816·9	9·88
...	...	3·0	1·01	38·4	...	17·7	...	1·5	·51	1·0	...	90·5	...	463·6	7·58
...	...	2·1	·52	112·3	1·04	20·3	...	1·6	·52	3·1	...	160·6	·52	576·9	9·88
1·2	·11	16·6	2·97	100·9	·20	75·0	·02	2·9	·35	13·6	·46	114·5	·06	726·3	10·30
·2	...	7·1	·68	30·7	·17	48·2	·17	1·2	...	2·7	·34	66·8	...	498·0	6·27
·3	...	6·2	·17	32·0	...	60·6	...	5·7	·67	4·4	·50	49·6	...	595·5	2·85
·4	·02	14·9	3·02	212·1	·34	43·6	·01	3·9	·46	8·5	·37	94·8	·07	825·1	9·22
·4	·07	2·6	·52	95·0	·07	17·4	·07	2·7	·37	3·4	·37	49·6	...	640·2	4·54
·3	·07	2·2	·45	260·7	·37	17·1	...	4·1	·37	3·2	·15	39·8	·07	770·7	3·66
·7	·10	9·7	2·16	315·6	·34	64·9	·04	4·6	·40	5·8	·08	86·3	·06	1,004·5	8·45
·4	...	·6	·36	154·8	·36	25·6	...	4·4	·54	1·8	...	56·1	·18	793·3	4·72
...	...	·5	·18	261·3	...	14·8	...	4·2	·18	1·6	...	39·7	...	805·7	3·66
1·4	·05	17·0	4·29	288·4	·32	20·0	...	3·2	·37	12·7	·48	121·5	·07	905·4	10·71
·7	...	1·2	·34	111·6	·17	6·4	...	2·5	·51	6·8	·34	52·8	...	621·8	5·07
·7	...	2·0	·17	77·4	...	11·5	...	3·4	·17	3·0	·17	60·7	·17	584·4	3·38
·7	·02	14·6	2·67	115·0	·11	27·3	...	2·6	·23	16·3	·43	124·1	·08	674·0	7·80
...	...	3·4	·34	94·7	·34	13·1	...	1·5	·17	9·3	·09	55·3	...	507·4	4·80
·2	...	3·3	·18	92·6	...	7·0	...	1·5	...	14·5	·09	48·1	...	461·0	1·79
·8	...	2·2	·73	152·2	·26	8·5	...	2·2	·46	10·2	·07	182·6	·20	710·7	7·40
...	...	1·3	...	118·0	...	4·0	...	·7	·99	13·9	...	112·7	...	522·2	6·63
...	...	2·1	·69	85·9	...	14·4	...	3·4	...	13·1	...	114·1	...	487·3	2·75
·5	·03	12·6	1·86	73·2	·11	25·4	...	2·0	·31	17·3	·20	159·0	·03	801·9	6·25
·9	·31	3·4	·19	76·3	...	5·8	...	·9	·31	9·2	...	87·9	·31	631·0	3·66
·9	...	3·5	·29	58·0	·29	2·3	...	3·2	·29	6·7	...	76·8	·29	463·5	2·93
·1	...	1·8	1·24	87·7	·17	27·7	...	3·0	·41	6·7	·30	78·3	·13	581·4	5·38
...	...	1·2	·17	52·7	·08	12·5	...	2·1	·17	2·6	...	34·1	·08	392·5	3·33
...	...	1·4	·16	64·0	·08	8·5	...	2·0	·08	·8	...	34·1	·08	434·0	2·20
·2	·03	10·1	1·52	150·2	·22	18·0	...	2·8	·30	11·3	·38	104·2	·19	768·6	8·19
·3	·30	4·5	·89	84·5	·30	11·3	...	2·1	·30	4·8	·30	43·1	...	514·3	5·65
...	...	2·2	·55	127·6	...	8·6	...	3·3	·28	8·6	·28	41·5	·83	528·0	6·92
·9	·03	11·8	2·25	161·8	·27	40·2	·01	3·1	·38	11·6	·38	111·0	·99	758·9	8·25
·2	·04	2·6	·39	82·4	·17	21·2	·04	2·2	·28	5·2	·15	55·5	·04	547·9	4·62
·2	·01	2·3	·25	125·5	·13	15·6	...	3·2	·23	5·4	·13	52·5	·13	580·5	3·26

TABLE NO. II.—*Ratios of Armies, 1913.*

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India
I.—Strength	36,585	32,093	70,755
II.*—Constantly sick per 1,000 of the average strength	31·6	29·2	80·8
III.—Admission rate of the year—			
Influenza...	2·2	3·6	2·7
Cholera	·1	0	·1
Small-pox	·2	·2	·2
Enteric Fever	2·5	2·2	2·3
Malaria	151·5	99·3	125·5
Sandfly Fever	49·5	7·1	28·9
Pyrexia of uncertain origin	20·9	9·3	15·6
Tubercle of the Lungs	·6	1·0	·8
Pneumonia	3·7	2·5	3·2
Respiratory Diseases	14·9	12·7	13·9
Dysentery	2·8	8·1	5·4
Diarrhœa...	13·1	12·3	13·1
Hepatic Abscess	·4	·6	·5
,, Congestion and Inflammation	9·5	6·0	7·8
Venereal Diseases	48·1	58·9	52·5
All Causes ...	639·4	517·7	580·5
IV.—Death rate of the year—			
Cholera	...	·03	·01
Small-pox	·03	...	·01
Enteric Fever	·36	·16	·25
Malaria	·19	·06	·13
Pyrexia of uncertain origin	...	...	...
Heat-stroke	·14	·09	·13
Circulatory Diseases	·27	·25	·25
Tubercle of the Lungs	·11	·22	·16
Pneumonia	·27	·19	·23
Respiratory Diseases	·03	·03	·03
Dysentery	·16	·09	·13
Diarrhœa	...	...	...
Hepatic Abscess	·16	·25	·20
All Causes ...	3·55	2·99	3·26

* Worked on the aggregates.

EUROPEAN TROOPS

TABLE NO. III.—*Ratios of Geographical Groups, 1913.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Island.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S'-E. Rajputana, Central India and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII (*a*) Hill Stations.	XII (*b*) Hill Convolescent Depôts and Sanatoria.	India.
I.—STRENGTH	1,156	1,237	1,924	5,973	13,397	15,461	5,917	11,175	1,455	3,411	12,228	3,612	70,755
II.—*CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH ...	39·7	38·2	43·2	29·2	34·5	32·1	30·9	27·1	34·3	20·2	22·4	41·0	80·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	...	·2	2·1	1·6	5·7	1·6	·7	1·2	7·6	...	2·7
Cholera	...	...	...	·3	·1	...	...	·1	...	...	...	...	·1
Small-pox	...	...	...	·3	·3	...	·7	·2	...	·6	...	...	·2
Enteric Fever	...	...	2·1	6·2	2·2	·5	2·0	3·3	2·1	3·5	1·4	2·2	2·3
Malaria	43·3	105·9	112·3	32·0	260·7	261·3	77·4	92·6	85·9	58·0	64·0	127·6	125·5
Sandfly Fever	...	...	...	12·9	59·8	146·1	31·8	8·1	·7	2·9	2·2	1·4	28·9
Pyrexia of uncertain origin ...	18·2	10·5	20·3	60·6	17·1	14·8	11·5	7·0	14·4	2·3	8·5	8·6	15·6
Rheumatic Fever ...	1·7	8·9	2·6	2·8	3·2	3·8	3·2	3·6	2·1	3·8	6·6	3·9	3·8
Tubercle of the Lungs ...	1·7	·8	2·1	·7	·7	·2	·8	1·1	·7	1·2	·3	1·9	·8
Pneumonia	1·7	3·2	1·6	5·7	4·1	4·2	3·4	1·5	3·4	3·2	2·0	3·3	3·2
Respiratory Diseases ...	24·2	15·4	13·0	16·7	16·2	16·7	14·5	9·4	11·0	13·8	9·5	13·8	13·9
Dysentery	·9	1·6	3·1	4·4	3·2	1·6	3·0	14·5	13·1	6·7	8	8·6	5·4
Diarrhœa	4·3	8·9	21·8	24·9	13·8	11·5	14·2	9·5	8·2	10·6	9·8	5·0	13·1
Hepatic { Abscess ...	...	·8	1·6	·2	·1	·5	·2	1·0	...	·3	·4	1·9	·5
Hepatic { Congestion and Inflammation ...	5·2	·8	15·1	13·4	10·3	3·8	12·2	4·6	7·6	5·6	5·6	7·5	7·8
Venereal Diseases ...	116·8	124·5	160·6	49·6	39·8	39·7	60·7	48·1	114·1	26·8	34·1	41·5	52·5
ALL CAUSES ...	609·9	629·2	576·9	595·5	770·7	805·7	584·4	461·0	487·3	463·5	434·0	528·0	580·5
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	...	...	...	·09	...	...	...	...	·01
Small-pox	...	...	...	...	·07	...	...	...	...	...	...	...	·01
Enteric Fever	...	...	·52	·17	·45	·18	·17	·18	·69	·29	·16	·55	·25
Malaria	...	...	1·04	...	·37	...	...	...	...	·29	·08	...	·13
Pyrexia of uncertain origin ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	...	...	·15	·55	...	·09	...	...	·08	...	·13
Circulatory Diseases ...	·87	...	1·04	·33	·15	·18	·34	·27	...	·29	·16	·55	·25
Tubercle of the Lungs ...	...	...	...	...	·15	...	·68	...	·69	...	·33	...	·16
Pneumonia	...	·81	·50	·67	·37	·18	·17	...	...	·29	·08	·28	·23
Respiratory Diseases ...	...	...	...	...	...	...	...	...	...	...	...	·28	·03
Dysentery	...	...	...	·50	·15	...	·17	·09	...	...	...	·28	·13
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	...	...	1·04	...	·07	·37	·17	·18	...	...	·16	1·11	·20
ALL CAUSES ...	6·92	·81	9·88	2·85	3·66	3·66	3·38	1·79	2·75	2·93	2·20	6·92	3·26

*Worked on the aggregates.

TABLE No. IV.—*Admission and death rates from Enteric fever in stations of over 1,000 strength.*

Stations.	1913.		Decennium, 1903-1912.		Stations.	1913.		Decennium, 1903-1912.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Lucknow	9·3	·39	23·0	3·58	Chakrata	1·7	...	4·7	·73
Poona	9·2	...	19·3	3·06	Secunderabad ...	1·6	·32	15·6	3·22
Sialkot	7·9	2·64	15·0	3·38	Bareilly	1·4	...	8·7	1·50
Belgaum	5·6	·94	11·2	2·20	Quetta	1·4	·29	10·7	1·64
Rawalpindi	4·6	·71	15·1	2·61	Aden	·9	...	3·6	·77
Bangalore	4·6	·46	16·5	2·29	Fort William ...	·8	·84	3·3	·32
Jhansi	2·8	...	25·7	7·60	Karachi	·8	...	4·1	·83
Colaba	2·7	·89	1·2	·85	Peshawar	·6	...	17·2	3·63
Kirkee	2·6	...	14·1	1·40	Nowshera	...	...	8·5	3·07
Ranikhet	2·4	...	11·2	1·79	Ferozepore... ...	...	...	8·8	1·51
Mhow and Indore ...	2·2	...	17·9	3·88	Ambala	...	...	13·0	2·87
Lahore Cantonment ...	1·7	...	16·1	3·06	Jubbulpore ...	...	...	15·5	2·77
Meerut	1·7	...	24·0	5·13	Rangoon... ...	...	...	2·1	·45

TABLE No. V.—*Statistics of Officers.*

SICKNESS and MORTALITY among OFFICERS of the BRITISH ARMY in 1913.

	Officers.		
	Northern Army.	Southern Army.	Army of India.
STRENGTH	1,155	1,028	2,398
CASES REMAINING FROM 1912	9·5	21·4	13·8
CONSTANTLY SICK	24·7	21·6	21·2
INVALIDING	13·9	17·5	14·2
ADMISSIONS.			
Influenza	8·7	10·7	8·8
Cholera	...	...	...
Small-pox	2·6	1·6	1·7
Enteric Fever	5·2	1·9	3·3
Malaria	64·9	45·7	50·9
Sandfly Fever	53·7	12·6	31·3
Pyrexia of uncertain origin	25·1	19·5	20·9
Tubercle of the Lungs	...	1·9	·8
Pneumonia	·9	...	·4
Respiratory Diseases	17·3	15·6	15·0
Dysentery	5·2	6·8	5·4
Diarrhœa	19·0	19·5	17·5
Hepatic Abscess	...	1·9	·8
Hepatic Congestion	17·3	17·5	15·8
Venereal Diseases	1·7	1·0	1·2
ALL CAUSES	623·4	567·1	545·9
DEATHS.			
Cholera	...	...	...
Small-pox	...	...	...
Enteric Fever	...	...	...
Malaria	...	...	...
Pyrexia of uncertain origin	...	...	...
Heat-stroke	...	...	...
Circulatory Diseases	·87	...	·42
Tubercle of the Lungs	...	...	...
Pneumonia	...	...	...
Respiratory Diseases	...	...	...
Dysentery	...	...	...
Diarrhœa	...	...	...
Hepatic Abscess	...	1·95	·83
Deaths not reported in Medical returns	...		...
ALL CAUSES	2·60	1·95	2·09
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES	...	...	3·34

TABLE NO. VI.—*Summary, Sickness*

Groups.	Years.	Average strength.	RATIO PER					
			Constantly sick.	Invaliding.	A.—ADMISSIONS D.—DEATHS			
					Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1903-1912	1,290	23·6	...	2·2	...	...	...
	1912	1,185	29·5	...	·8	...	...	...
	1913	1,267	24·5	...	...	...	...	...
„ II.—Burma Inland	1903-1912	3,048	23·9	...	·6	...	·2	·16
	1912	2,849	22·5	...	4·2	...	...	...
	1913	2,662	20·7	...	19·9	...	...	...
„ III.—Assam	1903-1912	960	26·7	...	1·0	...	·2	·21
	1912	933	23·6	...	...	...	...	...
	1913	1,010	29·7	...	...	...	...	...
„ IV.—Bengal and Orissa	1903-1912	2,254	26·3	...	4·9	...	·2	·27
	1912	2,332	25·3	...	·9	...	·4	·43
	1913	2,004	25·0	...	1·0	...	...	...
„ V.—Gangetic Plain and Chutia Nagpur	1903-1912	6,438	19·1	...	2·0	·02	·8	·48
	1912	6,441	16·9	...	·5	...	2·8	·24
	1913	6,140	16·9	...	2·4	...	1·0	·49
„ VI.—Upper Sub-Himalaya	1903-1912	19,848	21·9	...	3·2	...	·4	·29
	1912	21,418	25·1	...	7·7	...	·0	·05
	1913	21,940	22·4	...	3·5	...	·6	·32
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1903-1912	18,371	27·0	...	5·2	...	·3	·22
	1912	18,302	22·7	...	2·7	...	·1	·05
	1913	17,616	23·7	...	1·2	...	·1	...
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1903-1912	12,270	21·8	...	1·7	...	·3	·09
	1912	11,394	19·0	...	1·3	...	1·3	·53
	1913	11,673	17·1	...	·3	...	·3	·26
„ IX.—Deccan	1903-1912	17,073	19·3	...	3·1	·01	1·1	·63
	1912	18,039	19·7	...	1·5	...	2·5	1·00
	1913	17,734	17·6	...	5·0	...	·1	·11
„ X.—Western Coast	1903-1912	1,879	30·8	...	1·5	...	·1	·11
	1912	1,999	23·5	...	3·5	...	·5	·50
	1913	1,319	26·2	...	1·5	...	...	...
„ XI—Southern India	1903-1912	5,310	21·6	...	1·5	...	·7	·47
	1912	4,683	16·7	...	6·4	...	·2	...
	1913	4,491	16·5	...	5·6	...	·2	·22
„ XII.—Hill Stations	1903-1912	22,372	25·3	...	5·4	·03	·3	·25
	1912	22,019	21·3	...	2·7	...	...	...
	1913	21,535	22·9	...	·8	...	...	...
Army of India	1903-1912	127,971	22·1	7·20	3·3	·01	·5	·31
	1912	132,232	20·1	4·61	3·4	...	·6	·29
	1913	131,512	21·4	5·32	2·3	...	·3	·15

and Mortality by geographical groups.

MILLE OF STRENGTH.

FROM

FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All Causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·2	...	...	...	150·1	·47	79·1	·16	2·6	·70	45·7	·08	20·8	·08	658·6	4·11
...	...	...	...	146·0	...	17·7	...	3·4	...	7·6	...	36·3	...	661·6	4·38
·8	...	...	...	38·7	·79	80·5	...	7·1	...	8·7	...	30·0	...	702·4	2·37
·2	...	·5	·07	219·5	1·31	39·5	·13	3·0	·62	20·7	·13	15·2	...	632·4	5·15
·7	...	...	...	223·6	·70	51·2	...	2·5	·35	5·3	...	14·0	...	632·9	1·40
...	...	·4	...	153·3	·75	14·7	...	1·9	1·13	8·6	·38	9·8	...	514·7	3·01
·1	...	1·3	·31	283·1	1·15	9·0	...	9·4	1·25	41·6	·42	28·1	...	380·3	5·83
...	...	1·1	...	184·4	...	43·9	...	9·6	1·07	30·0	...	20·4	...	716·0	8·57
...	...	...	...	270·3	...	85·1	...	5·1	...	18·8	...	25·7	...	973·3	·99
·2	...	·7	·22	252·1	·71	48·2	·18	7·7	1·20	55·4	·31	22·0	·09	725·2	5·10
...	...	1·3	·43	176·7	...	160·4	·43	9·0	·86	19·3	1·29	15·9	...	817·3	5·15
...	...	1·0	·50	153·2	...	88·3	...	4·5	...	12·0	...	31·4	...	805·9	2·99
·4	·02	·7	·22	126·3	·61	20·2	·11	7·6	1·37	33·2	·26	16·5	·06	519·6	5·79
·6	...	2·0	·47	22·5	·16	40·8	·16	4·0	·62	10·1	...	13·4	·16	446·4	4·04
·9	...	1·3	·33	15·5	...	41·5	...	5·2	·33	4·9	·16	5·9	...	471·5	2·44
·7	··	2·1	·53	176 1	·70	22·0	·09	11·7	2·05	24·6	·12	16·8	·04	575·4	6·85
·5	·03	1·5	·33	72·8	·09	55·6	·19	7·2	1·03	13·2	...	17·9	·05	638·2	4·34
·9	·05	2·1	·55	124·1	·27	59·7	·18	7·9	1·41	15·3	·05	11·9	·05	635·1	5·33
·8	...	2·0	·41	332·8	·69	13·6	·05	16·9	3·04	40·6	·13	10·7	·03	856·3	7·03
·5	·02	2·4	·75	134·5	·91	37·3	·11	7·5	·48	16·2	·05	8·5	·05	705·4	3·16
·6	...	1·7	·11	198·7	·34	44·6	·40	13·3	1·87	10·4	·17	7·6	·06	754·1	4·83
·7	·02	1·7	·41	227·4	·56	10·5	·05	11·7	1·80	22·7	·08	17·3	·03	626·8	5·88
0·1	·09	2·3	·44	65·4	...	42·2	...	7·9	1·05	23·4	...	12·3	·09	478·3	4·21
0·1	...	1·8	·26	88·7	...	12·5	·09	7·6	1·20	11·3	...	9·5	...	453·9	3·43
·8	·02	1·8	·36	93·4	·37	27·9	·08	6·9	1·03	27·0	·10	24·2	·04	489·8	5·48
·4	...	2·8	1·00	56·1	·44	42·5	·11	6·3	·72	15·4	·05	19·7	·05	479·8	5·99
·8	...	1·4	·17	40·0	·06	19·9	...	8·0	1·07	13·5	·06	23·3	·06	423·1	3·95
1·8	·11	1·2	·59	228·4	1·06	15·8	·11	9·2	2·34	58·9	·64	34·6	·16	766·5	10·75
...	·50	...	...	125·1	·50	25·0	...	10·0	2·00	0·19	1·00	16·0	...	610·8	8·00
...	...	...	...	140·3	...	65·2	·76	3·8	1·52	69·0	·76	26·5	...	794·5	5·31
·4	·04	·5	·06	133·9	·34	26·0	·06	7·4	1·09	24·4	·26	28·3	·08	536·9	6·21
1·1	...	·2	...	143·3	...	10·9	·21	2·6	·21	8·8	·21	19·4	...	486·7	3·63
·2	...	·2	...	55·9	·22	1·8	...	4·9	·22	8·5	·22	19·6	...	369·0	3·34
·2	·04	2·4	·56	185·9	·86	25·8	·07	13·3	2·28	26·9	·21	17·3	·04	619·6	8·71
·3	...	2·9	·59	89·5	·45	45·1	·14	8·5	1·54	6·9	·09	9·3	...	548·3	5·63
·3	...	2·6	·28	112·0	·37	38·3	·19	7·0	·88	3·6	·05	10·1	·05	579·4	4·69
·5	·02	1·9	·35	191·6	·99	21·5	·07	10·8	1·79	30·7	·18	17·3	·04	607·2	6·59
·5	·02	1·8	·47	88·9	·26	44·1	·11	9·6	·83	16·7	·10	14·4	·05	547·5	4·42
·5	·01	1·9	·23	100·4	·22	35·4	·14	7·6	1·01	12·0	·09	12·6	·03	531·7	4·01

TABLE No. VII.—*Ratios of Armies, 1913.*

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army	Army of India.
I.—Average Annual Strength	61,387	49,761	131'512
II.—Constantly sick	22'6	24'7	21'4
III.—Admission rate of the year—			
Influenza	2'1	3'5	2'3
Cholera	'4	'1	'3
Small-pox	'7	'7	'6
Enteric Fever	2'2	1'2	1'6
Malaria	133'5	75'2	100'4
Sandfly Fever	24'5	6'8	14'5
Pyrexia of uncertain origin	45'6	29'7	35'4
Plague	'1	'3	'2
Tubercle of the Lungs	2'2	1'4	1'8
Pneumonia	9'3	6'3	7'6
Respiratory Diseases	26'5	22'1	24'2
Dysentery	10'5	12'9	12'0
Diarrhœa	13'1	16'0	13'9
Hepatic { Abscess	'1	'1	'1
Hepatic { Congestion and Inflammation	1'1	1'0	1'0
Scurvy	'3	'7	'4
Venereal Diseases	11'1	15'7	12'6
All Causes ...	649'0	480'0	531'7
IV.—Death rate of the year—			
Cholera	'16	'12	'15
Small-pox	'02	...	'01
Enteric Fever	'39	'10	'23
Malaria	'33	'10	'22
Sandfly Fever	...	...	...
Pyrexia of uncertain origin	'18	'12	'14
Plague	'07	'16	'10
Circulatory Diseases	'16	'22	'16
Tubercle of the Lungs	'36	'18	'24
Pneumonia	1'24	'96	1'01
Respiratory Diseases	'28	'10	'20
Dysentery	'07	'12	'09
Diarrhœa	...	'02	'01
Hepatic Abscess	'02	'04	'02
Anæmia and Debility	...	'06	'06
All Causes ...	4'77	3'60	4'01

TABLE NO. VIII.—*Ratios of Geographical Groups, 1913.*

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV. Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India*
I.—AVERAGE ANNUAL STRENGTH—	1,267	2,662	1,010	2,004	6,140	21,940	17,616	11,673	17,734	1,319	4,491	21,535	131,512
II.—CONSTANTLY SICK—	24·5	20·7	29·7	25·0	16·9	22·4	23·7	17·1	17·6	26·2	16·5	22·9	21·4
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	19·9	...	1·0	2·4	3·5	1·2	·3	5·0	1·5	5·6	·8	2·3
Cholera	...	...	...	...	1·0	·6	·1	·3	·1	...	·2	...	·3
Small-pox	·8	...	...	...	·7	·8	·9	1·0	·8	...	1·1	·3	·6
Enteric Fever	...	·4	...	1·0	1·3	2·1	1·9	1·8	1·4	...	·2	2·6	1·6
Malaria	38·7	153·3	270·3	153·2	15·5	124·1	198·7	82·7	40·0	140·3	55·9	112·0	100·4
Sandfly Fever	...	...	...	...	2·3	39·5	26·6	29·0	1·7	·8	·2	4·9	14·5
Pyrexia of uncertain origin	80·5	14·7	85·1	88·3	41·5	59·7	44·6	12·5	19·9	65·2	1·8	38·3	35·4
Plague	...	...	...	...	·7	·1	·1	...	·7	...	·2	·1	·2
Tubercle of the Lungs	·3	...	2·0	2·5	1·1	2·6	2·0	2·1	1·3	1·5	·9	1·7	1·8
Pneumonia	7·1	1·9	5·0	4·5	5·2	7·9	13·3	7·6	8·0	3·8	4·9	7·0	7·6
Respiratory Diseases	41·0	29·7	34·7	46·9	23·6	25·6	25·8	17·5	22·4	52·3	20·0	24·2	24·2
Dysentery	8·7	8·5	18·8	12·0	4·9	15·3	10·4	11·3	13·5	69·0	8·5	3·6	12·0
Diarrhœa	5·5	5·3	16·8	21·5	9·0	10·5	16·9	6·8	14·7	30·3	15·8	20·1	13·9
Hepatic { Abscess	...	...	...	...	...	...	·2	·1	...	...	·2	·1	·1
Hepatic { Congestion and Inflammation	3·9	...	2·0	1·0	·5	1·7	·6	1·3	·9	4·5	·4	1·1	1·0
Scurvy	1·6	...	...	·5	...	·4	·2	·3	·3	·8	·9	·5	·4
Venereal Diseases	30·0	9·8	25·7	31·4	5·9	11·9	7·6	9·5	23·3	26·5	19·6	10·1	12·6
ALL CAUSES	702·4	514·7	973·3	805·9	471·5	635·1	754·1	453·9	423·1	794·5	369·0	579·4	531·7
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	·49	·32	...	·26	·11	...	·22	...	·15
Small-pox	...	...	...	...	...	...	·06	...	...	...	...	...	·01
Enteric Fever	...	...	...	·50	·33	·55	·11	·16	·17	...	...	·28	·23
Malaria	·79	·75	...	...	...	·27	·34	...	·06	...	·22	·37	·22
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin	...	...	...	...	...	·18	·40	·09	...	·76	...	·19	·14
Plague	...	...	...	...	·49	·05	...	...	·39	...	·22	...	·10
Circulatory Diseases	·79	...	...	·50	·16	·05	·17	·17	·34	...	·45	·19	·16
Tubercle of the Lungs	...	...	...	...	...	·46	·17	·17	·11	...	·22	·60	·24
Pneumonia	...	1·13	...	...	·33	1·41	1·87	1·20	1·07	1·52	·22	·88	1·01
Respiratory Diseases	...	...	...	...	...	·32	·23	...	·06	·76	·22	·37	·20
Dysentery	...	·38	...	...	·16	·05	·17	...	·06	·76	·22	·05	·09
Diarrhœa	...	...	...	...	...	...	...	...	·06	...	...	...	·01
Hepatic Abscess	...	...	...	...	...	...	·06	·09	...	...	...	·05	·02
Anæmia and Debility	...	·38	...	...	...	...	...	...	...	1·52	...	...	·06
ALL CAUSES	2·37	3·01	·99	2·99	2·44	5·33	4·83	3·43	3·95	5·31	3·34	4·69	4·01

* Including Group Extra India Field Forces and troops on the line of march.

TABLE No. IX.—PART I.—*Summary, Sickness and Mortality—1913.*

Administrations.	Years.	Average strength.‡	RATIO PER MILLE OF STRENGTH: * Constantly sick.	A.—Admissions from / D.—Deaths from: Cholera A.	Cholera D.	Small-pox A.	Small-pox D.	Malaria A.	Malaria D.	Tubercle of the lungs A.	Tubercle of the lungs D.	Pneumonia A.	Pneumonia D.	Respiratory Diseases A.	Respiratory Diseases D.	Dysentery A.	Dysentery D.	Diarrhœa A.	Diarrhœa D.	Anæmia and debility A.	Anæmia and debility D.	All causes A.	All causes D.
Burma	1903-1912	13,757	16	1·3	·81	·3	·06	48·7	·46	7·2	3·61	3·5	1·01	11·6	·49	34·1	1·85	13·1	·47	3·4	·21	316·2	15·30
	1912	16,339	15	2·3	1·84	·8	·24	30·4	·43	7·7	4·47	3·7	1·10	13·5	·85	20·6	2·39	6·7	·18	3·4	·18	288·9	20·60
	1913	16,748	15	·2	·18	...	...	28·6	·18	6·6	4·00	3·4	·84	10·9	·54	20·1	1·43	10·6	·24	4·5	·42	269·6	16·24
Assam	1903-1912	1,513	36	1·8	1·45	·6	·07	298·3	3·17	5·6	2·78	10·8	3·31	23·4	1·06	189·9	11·70	79·9	1·32	20·0	3·04	904·0	37·82
	1912	1,600	39	1·9	·62	·6	...	152·5	1·25	5·0	1·88	12·1	3·43	30·6	3·75	291·9	15·62	69·4	1·35	14·4	·62	900·6	37·50
	1913	1,672	37	1·8	1·20	...	...	154·3	4·19	9·0	2·39	13·2	5·98	22·1	1·20	303·2	11·96	78·9	1·79	14·4	2·39	1,023·3	40·67
Bengal	1903-1912	11,493	42	1·0	·68	·5	·08	262·8	1·84	14·3	4·44	10·7	3·09	34·9	1·04	203·6	5·41	88·2	·87	16·1	·65	959·3	24·42
	1912	10,621	44	·4	·28	·9	·28	252·1	1·69	12·5	3·30	7·5	1·79	41·6	1·13	160·9	4·05	115·6	1·41	17·0	·56	973·3	21·84
	1913	11,273	51	·5	·18	·2	...	268·4	·98	12·2	3·10	8·9	2·22	38·2	1·15	181·5	5·85	112·6	·80	19·0	·62	1,068·6	20·85
Bihar and Orissa	1903-1912	8,043	33	2·4	1·26	·9	·10	296·8	1·31	9·4	3·42	8·0	2·03	29·6	·50	150·2	5·60	89·3	1·16	12·5	·71	884·8	22·67
	1912	6,320	32	3·2	1·37	...	...	179·3	·32	13·6	3·96	5·2	1·74	31·5	·16	100·9	2·69	145·5	·95	18·9	·79	782·3	17·88
	1913	6,697	32	·7	·30	·1	...	147·5	·45	9·1	3·14	6·6	1·49	31·4	·75	89·7	3·88	99·1	1·34	17·5	·75	714·9	20·01
United Provinces of Agra and Oudh ...	1903-1912	24,543	27	·5	·30	·8	·07	188·5	·92	7·4	2·55	14·6	3·19	21·6	·92	36·7	2·53	21·9	1·01	8·9	·33	569·1	16·99
	1912	22,327	23	...	...	·6	...	74·2	·40	7·4	2·02	9·7	1·61	17·6	·63	24·6	1·88	15·3	·40	7·8	·13	435·7	10·48
	1913	21,822	21	·3	·14	·7	·05	78·2	·55	4·4	1·56	9·7	1·88	19·0	·64	23·4	1·37	15·9	·69	7·5	·14	405·8	11·50
Punjab	1903-1912	11,268	28	·2	·08	·7	·07	211·4	·48	12·4	4·96	17·6	4·00	39·0	·79	39·7	2·38	44·7	1·08	20·9	·65	694·4	21·29
	1912	11,432	27	·1	...	1·7	·35	103·9	·17	13·0	5·25	10·4	3·32	37·3	·35	36·5	2·62	36·4	·79	24·0	·17	567·1	19·42
	1913	12,906	33	·5	·31	1·2	...	101·6	·39	23·6	5·59	18·2	2·32	37·9	·62	32·1	·93	27·7	1·08	20·5	·15	615·5	16·81
North-West Frontier Province ...	1903-1912	1,373	30	·1	...	·3	·07	449·4	·73	5·5	1·31	18·5	3·42	29·1	1·02	65·9	2·26	38·8	·58	12·8	·36	1,027·7	17·49
	1912	1,622	22	...	...	...	...	337·9	·62	3·7	·62	11·7	·62	8·0	1·23	41·3	1·85	33·3	1·23	5·5	...	828·6	11·71
	1913	2,008	22	...	...	1·5	...	506·0	1·00	9·0	1·99	20·4	3·49	18·4	1·49	75·2	1·99	25·4	...	9·0	·50	944·7	15·44
Central Provinces	1903-1912	3,680	20	·2	·08	·5	·05	167·5	·71	7·1	3·12	7·2	1·41	18·9	1·30	52·5	5·38	33·3	·62	11·0	·52	581·5	20·73
	1912	3,130	14	·3	...	·3	...	49·5	·32	8·0	3·51	5·4	1·28	10·9	2·24	60·7	3·83	35·8	1·92	5·1	...	406·4	19·81
	1913	3,581	12	·3	...	1·1	·28	28·2	·28	7·8	3·07	4·5	1·95	10·3	·28	39·9	1·95	19·3	·28	4·7	...	276·5	13·40
Bombay	1903-1912	8,016	27	1·1	·47	·9	·05	123·8	·92	5·3	2·35	14·8	4·12	33·6	1·15	42·6	1·53	38·0	1·11	11·0	·62	572·6	19·09
	1912	9,053	22	4·4	1·88	1·3	...	67·0	·33	5·5	1·99	7·6	2·32	24·0	·77	44·0	1·99	40·8	1·55	8·8	·55	483·4	17·22
	1913	9,726	22	·1	·10	·4	...	72·6	·51	4·0	1·44	9·2	2·16	27·2	·93	40·0	1·34	35·2	1·95	6·7	·31	494·8	15·42
Madras	1903-1912	10,003	21	5·2	2·38	·3	·02	74·5	·83	9·8	2·79	6·7	1·57	23·7	·46	54·8	3·48	8·1	·16	9·4	·43	436·6	18·95
	1912	9,056	20	2·5	1·33	...	...	49·1	·22	8·8	2·32	2·9	·33	21·9	·66	34·8	1·10	19·2	·55	3·4	...	428·2	11·37
	1913	9,178	16	·2	...	·1	...	32·0	1·09	6·6	1·74	2·3	·44	24·1	·22	28·6	·54	10·9	·22	3·9	·11	353·2	7·74
INDIA†	1903-1912	94,702	27	1·3	·71	·6	·07	177·3	·96	9·0	3·32	11·2	2·75	25·7	·81	71·1	3·30	38·9	·84	11·3	·49	632·3	19·55
	1912	92,626	25	1·4	·77	·8	·13	105·2	·52	9·6	3·18	8·0	1·72	24·0	·79	55·4	2·59	41·2	·79	10·6	·27	535·6	16·74
	1913	96,745	26	·4	·18	·5	·02	108·2	·62	9·2	2·94	9·0	1·80	24·6	·68	55·6	2·16	38·0	·82	10·6	·35	540·2	15·52
ANDAMANS	1903-1912	13,326	75	·0	·01	...	...	1,104·1	3·32	10·0	6·61	14·1	5·03	63·8	1·12	222·4	6·72	45·4	·89	·4	·01	1,739·8	32·23
	1912	11,280	75	...	...	...	...	993·7	2·57	8·1	5·33	17·8	6·21	74·2	1·60	99·1	6·03	45·9	·44	·4	·09	1,624·2	31·65
	1913	11,541	53	...	...	...	...	968·6	1·82	3·8	3·47	12·3	5·20	64·6	·87	77·6	3·55	29·5	·35	·3	·09	1,502·3	25·30
INDIA§	1903-1912	108,118	33	1·2	·62	·5	·06	291·5	1·25	9·2	3·73	11·5	3·03	30·4	·85	77·5	3·72	39·7	·83	10·1	·43	760·0	21·11
	1912	103,906	30	1·3	·68	·7	·12	201·6	·74	9·5	3·41	9·1	2·20	29·4	·88	60·2	2·96	41·7	·75	9·5	·25	653·8	18·36
	1913	108,286	29	·3	·16	·4	·02	199·4	·75	8·6	2·99	9·3	2·16	28·8	·70	57·9	2·31	37·1	·77	9·6	·32	642·8	16·56

* Excluding subsidiary jails.
† Including Delhi, Ajmer, Sibi, Quetta, Mercara and Secunderabad, and excluding Andamans.
‡ The decennial ratios are worked on the total strength of the ten year period.

TABLE NO. IX PART II.—*Summary, Sickness and Mortality—1913.*

Groups.	Years.	Average strength.‡	Constantly sick.	RATIO PER MILLE OF STRENGTH.* A.—Admissions from D.—Deaths from: Influenza. A.	Influenza. D.	Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Enteric Fever. A.	Enteric Fever. D.	Malaria. A.	Malaria. D.	Pyrexia of uncertain origin. A.	Pyrexia of uncertain origin. D.	Pneumonia. A.	Pneumonia. D.	Dysentery. A.	Dysentery. D.	Diarrhœa. A.	Diarrhœa. D.	All causes. A.	All causes. D.
Group I.—Burma Coast and Bay Islands.	1903-1912	12,256	27	3·3	·02	·5	·24	·2	·05	·7	·19	289·9	1·09	20·5	·01	4·7	1·53	46·2	2·87	32·4	·61	663·0	18·72
	1912	11,153	16	...	...	·6	·45	·4	·18	1·5	·18	32·5	·09	36·2	·09	3·0	1·08	22·2	2·96	7·3	·27	317·3	20·62
	1913	11,556	15	...	...	·3	·26	...	...	3·7	·35	22·3	·26	24·9	·09	2·6	·78	18·2	1·21	9·0	...	278·2	16·27
,, II.—Burma Inland	1903-1912	4,202	17	·10	...	2·8	1·03	·2	·05	1·0	·31	50·1	·67	11·9	·02	4·7	1·38	39·8	2·64	20·1	·90	319·7	17·68
	1912	5,186	13	·2	...	6·0	4·82	1·7	·39	·4	·19	25·6	1·16	9·8	...	5·8	1·16	17·0	1·16	5·6	...	227·7	20·83
	1913	5,192	14	·2	...	...	...	...	...	1·0	·19	26·0	...	12·3	...	5·2	·96	24·3	1·93	14·3	·77	248·3	16·18
,, III.—Assam ...	1903-1912	1,445	37	13·6	...	1·9	1·52	·6	·07	·8	·28	301·3	3·18	4·2	...	10·8	3·32	189·0	11·42	80·0	1·31	905·1	37·50
	1912	1,516	40	...	...	2·0	·66	·7	...	...	...	149·1	1·32	25·1	...	13·2	3·30	294·9	15·83	69·9	1·32	903·7	38·92
	1913	1,576	38	...	...	1·9	1·27	...	...	...	...	154·2	3·81	161·8	...	14·0	6·35	306·5	11·42	81·9	1·90	1,040·6	40·61
,, IV.—Bengal and Orissa ...	1903-1912	12,430	41	9·5	·28	1·6	·93	·5	·08	1·1	·32	290·4	1·72	4·6	·03	10·4	2·98	198·8	5·62	86·2	·10	940·5	24·60
	1912	11,396	43	2·1	·09	1·8	·79	·9	·26	1·5	·44	243·6	1·58	10·4	·09	7·4	1·76	157·2	3·86	112·0	1·40	952·4	22·20
	1913	12,059	49	...	...	·7	·17	·2	...	1·2	·25	257·7	·91	3·9	...	8·6	2·16	175·6	5·97	112·6	·83	1,050·0	21·23
,, V.—Gangetic Plain and Chutia Nagpur.	1903-1912	22,630	28	2·6	·04	·9	·51	·9	·07	·5	·12	198·2	1·10	6·8	·02	9·9	2·25	71·9	3·47	42·0	1·01	632·3	18·26
	1912	19,490	26	·4	...	·2	·10	·1	...	·6	·05	101·8	·41	7·4	...	6·2	1·54	45·3	2·26	49·3	·62	525·6	12·26
	1913	19,459	25	·5	...	·5	·26	·5	·05	·5	·21	93·8	·62	9·4	·15	6·4	1·59	44·0	2·21	41·7	·87	477·3	13·77
,, VI.—Upper Sub-Himalaya ...	1903-1912	12,463	29	7·3	·13	·1	·06	·7	·13	·6	·18	268·1	·66	5·9	·02	19·7	4·67	41·2	2·49	36·6	1·25	714·1	19·74
	1912	12,570	28	·1	...	·1	...	1·4	·32	·5	·08	135·2	·24	15·0	·08	16·9	2·47	29·7	2·31	35·0	·80	565·2	15·43
	1913	13,477	33	1·8	...	·4	·30	·9	...	·7	·22	158·1	·52	70·8	·07	19·1	2·89	27·2	·96	39·0	1·19	701·0	15·14
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1903-1912	8,458	28	5·8	·13	·2	·06	·8	·07	·4	·12	203·0	·91	2·8	·04	21·8	5·49	44·2	2·36	36·3	·73	662·0	22·68
	1912	9,219	22	·1	·11	...	...	1·2	·11	·3	...	128·3	·33	6·6	·11	13·5	3·04	35·5	1·63	20·3	·54	542·6	16·49
	1913	10,258	23	...	...	...	...	1·2	...	·9	...	160·1	·68	7·5	...	14·3	2·24	41·8	1·36	12·2	·78	501·4	17·16
,, VIII.—South-Western Rajputana, Central India and Gujarat.	1903-1912	4,302	31	2·0	·02	·7	·42	·6	·02	·2	·07	168·8	·53	·8	·02	17·2	3·84	23·3	1·46	27·8	·79	574·7	16·25
	1912	3,979	23	...	...	4·0	1·76	3·3	...	·3	...	76·7	·75	2·3	...	6·0	1·26	20·9	2·01	33·1	·75	415·4	14·58
	1913	3,919	21	1·0	...	...	...	·8	...	...	...	89·3	·26	...	...	13·5	1·53	16·3	·51	15·1	·26	417·7	10·40
,, IX.—Deccan ...	1903-1912	7,221	26	6·9	·04	·7	·33	·4	·04	·4	·12	158·0	·65	8·7	...	6·2	1·26	52·3	3·30	40·3	·68	649·4	16·59
	1912	7,014	19	4·0	...	3·3	1·43	·4	...	·6	·14	54·6	·29	34·6	...	6·6	1·71	56·2	2·71	48·5	1·14	510·4	16·11
	1913	7,934	18	5·9	...	·1	...	·5	·13	1·0	·25	27·0	·13	38·4	·60	5·5	1·64	41·6	1·51	40·8	1·01	438·7	11·85
,, X.—Western Coast ...	1903-1912	2,385	22	·0	...	1·6	·63	·8	·08	5·6	1·09	108·1	1·22	11·1	·08	8·6	2·39	55·3	2·52	37·6	1·38	507·5	23·15
	1912	2,208	20	...	...	·9	...	·5	...	2·3	...	68·8	...	5·4	...	6·8	1·81	53·0	1·81	32·2	3·62	446·6	24·95
	1913	2,188	22	...	...	·5	·46	...	...	...	...	74·5	·91	8·7	...	11·9	3·20	62·6	1·37	20·6	4·11	452·5	20·57
,, XI.—Southern India ...	1903-1912	9,063	21	·6	·01	5·3	2·29	·3	·01	1·2	·22	74·6	·67	24·0	...	6·6	1·62	53·8	3·34	7·0	·18	433·9	18·19
	1912	8,310	20	·7	...	2·8	1·44	...	...	1·4	...	48·6	·24	54·5	...	3·0	·36	37·4	1·20	20·9	·16	429·8	12·03
	1913	8,482	16	1·5	...	·2	...	·1	...	·4	...	31·8	1·06	21·6	...	2·0	·35	22·9	·59	11·8	·24	354·0	7·90
,, XII.—Hills ...	1903-1912	579	27	...	...	6·9	5·19	·9	...	2·8	1·04	251·2	2·94	10·4	...	21·3	5·53	90·9	8·12	63·6	1·90	887·1	36·47
	1912	534	28	...	...	...	...	...	...	5·6	...	250·9	...	7·5	...	22·5	5·62	135·5	7·49	106·7	1·87	985·0	22·47
	1913	583	22	...	...	...	...	3·4	...	...	...	223·0	1·72	...	...	27·4	3·43	111·5	3·43	32·6	1·72	813·0	22·30
INDIA †	1903-1912	94,792	27	4·5	·07	1·3	·71	·6	·07	·8	·21	177·3	·96	9·8	·02	11·2	2·75	71·1	3·30	38·9	·84	622·3	19·55
	1912	92,626	25	1·3	·02	1·4	·77	·8	·13	·9	·12	105·2	·52	18·6	·04	8·0	1·72	55·4	2·59	41·2	·79	535·6	16·74
	1913	96,745	26	1·0	...	·4	·18	·5	·02	1·1	·18	108·2	·62	24·5	·09	9·0	1·80	55·6	2·16	38·0	·82	540·2	15·52
ANDAMANS	1903-1912	13,326	75	5·9	·01	·0	·01	...	...	·1	·03	1,104·1	3·32	9·9	·05	14·1	5·03	122·4	6·72	45·4	·80	1,739·8	32·23
	1912	11,280	75	...	...	...	...	...	...	...	...	993·7	2·57	6·1	·44	17·8	6·21	99·1	6·03	45·9	·44	1,624·2	31·65
	1913	11,541	53	...	...	...	...	...	...	·2	·09	963·6	1·82	5·1	...	12·3	5·20	77·6	3·55	29·5	·35	1,502·3	25·30
INDIA§	1903-1912	108,118	33	4·7	·06	1·2	·62	·5	·06	·7	·19	291·5	1·25	9·8	·02	11·5	3·03	77·5	3·72	39·7	·83	760·0	21·11
	1912	103,906	30	1·2	·02	1·3	·68	·7	·12	·8	·11	201·6	·74	17·3	·09	9·1	2·20	60·2	2·96	41·7	·75	653·8	18·36
	1913	108,286	29	·9	...	·8	·16	·4	·02	1·0	·17	199·4	·75	22·5	·08	9·3	2·16	57·9	2·31	37·1	·77	642·8	16·56

*Excluding subsidiary jails.
† Including Aden and excluding Andamans.
‡ The decennial ratios are worked on the total strength of the ten year period.
§ Including Andamans.

TABLE NO. X.—*Ratios of administrations, 1913.*

	Ratios per 1,000 of the average strength.												
	Burma.	Assam.	Bengal.	Bihar and Orissa.	United Provinces.	Punjab.	N.-W. F. Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH ...	16,748	1,672	11,273	6,697	21,822	12,906	2,008	3,581	9,726	9,178	96,745	11,541	108,286
II.—CONSTANTLY SICK RATE OF THE YEAR	14·7	37·1	50·7	31·8	21·2	32·8	21·9	12·3	21·6	15·8	25·7	53·1	28·6
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	33·9	48·5	30·3	...	31·9	21·7	12·3	20·3	15·8	25·0	...	27·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	·1	...	...	·7	·9	...	...	10·9	·8	1·4	1·0	...	·9
Cholera	·2	1·8	·5	·7	·3	·5	...	·3	·1	·2	·4	...	·3
Small-pox	...	...	·2	·1	·7	1·2	1·5	1·1	·4	·1	·5	...	·4
Eteric Fever	2·9	...	1·2	1·0	·5	·9	...	1·7	·3	·3	1·1	·2	1·0
Malaria	23·6	151·3	268·4	147·5	78·2	101·6	506·0	28·2	72·6	32·0	108·2	963·6	199·4
Sandfly Fever	...	...	...	...	...	...	4·5	...	...	...	·1	...	·1
Pyrexia of uncertain origin ...	21·0	152·5	3·0	25·7	2·0	74·8	16·4	10·3	28·1	21·8	24·5	5·1	23·5
Tubercle of the Lungs ...	6·6	9·0	12·2	9·1	4·4	23·6	9·0	7·8	4·0	6·6	9·2	3·8	8·6
Pneumonia	3·4	13·2	8·9	6·6	9·7	18·2	20·4	4·5	9·2	2·3	9·0	12·3	9·3
Respiratory Diseases ...	10·9	22·1	38·2	31·4	19·0	37·9	18·4	10·31	27·2	24·1	24·6	64·6	28·8
Dysentery	20·1	303·2	181·5	89·7	23·4	32·1	75·2	39·9	40·0	23·6	55·6	77·6	57·9
Diarrhœa	10·6	78·9	112·6	99·1	15·9	27·7	25·4	19·3	35·2	10·9	38·9	29·5	37·1
Spleen Diseases	...	...	·1	1·0	...	1·5	...	...	·5	...	·4	·1	·3
Scurvy	·4	21·5	·1	·1	...	·3	1·0	1·1	4·7	...	1·1	4·7	1·4
Anaemia and Debility ...	4·5	14·4	19·0	17·5	7·5	20·5	9·0	4·7	6·7	3·9	10·6	·3	9·5
Abscess, Ulcer and Boil ...	81·5	38·3	71·6	82·0	70·0	80·2	84·7	29·0	46·3	29·2	57·8	81·1	60·3
ALL CAUSES ...	269·6	1,023·3	1,068·6	714·9	405·8	615·5	944·7	276·5	494·8	353·2	540·2	1,502·3	643·8
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	943·7	1,054·3	702·6	...	620·7	944·5	276·9	514·0	425·5	549·1	...	645·3
IV.—DEATH RATE OF THE YEAR—													
Cholera	·18	1·20	·18	·30	·14	·31	...	...	·10	...	·18	...	·16
Small-pox...	...	...	...	...	·05	...	...	·28	...	...	·02	...	·02
Enteric Fever	·30	...	·27	·45	·14	·08	...	·56	...	...	·18	·09	·17
Malaria	·18	4·19	·98	·45	·55	·39	1·00	·28	·51	1·09	·62	1·82	·75
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	·06	...	...	...	·18	...	...	...	·41	...	·09	...	·08
Tubercle of the Lungs ...	4·00	2·39	3·10	3·14	1·56	5·89	1·99	3·07	1·44	1·74	2·94	3·47	2·99
Pneumonia	·84	5·98	2·22	1·49	1·83	2·32	3·49	1·95	2·16	·44	1·89	5·20	2·16
Respiratory Diseases ...	·54	1·20	1·15	·75	·64	·62	1·49	·28	·93	·22	·68	·87	·70
Dysentery	1·43	11·96	5·85	3·88	1·37	·93	1·99	1·95	1·34	·54	2·16	3·55	2·31
Diarrhœa	·24	1·79	·80	1·34	·69	1·08	...	·28	1·95	·22	·82	·35	·77
Hepatic Abscess	·30	...	·09	...	·05	...	...	...	·10	...	·08	...	·07
Anæmia and Debility ...	·42	2·39	·62	·75	·14	·15	·50	...	·31	·11	·35	·09	·31
Phagedæna, Slough, and Gangrene	...	·60	...	...	...	...	...	...	...	...	·01	·09	·02
ALL CAUSES ...	16·24	40·67	20·85	20·01	11·50	16·81	15·44	13·40	15·42	7·74	15·52	25·30	16·56
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	40·69	20·10	19·61	...	16·39	14·98	13·40	1·57	7·90	15·33	...	16·34

* Including Delhi, Ajmer, Sibi, Quetta, Secunderabad, Mercara and excluding Andamans.
† Including Delhi, Ajmer, Sibi, Quetta, Secunderabad, Mercara and Andamans.

TABLE NO. XI.—*Ratios of Geographical Groups, 1913.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH ...	11,556	5,192	1,576	12,059	19,459	13,477	10,258	3,919	7,934	2,188	8,482	583	96,745
II.—CONSTANTLY SICK RATE OF THE YEAR	14·9	14·3	38·1	49·4	24·9	32·8	22·7	20·7	17·9	21·9	16·0	22·3	25·7
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	·2	...	...	·5	1·8	...	1·0	5·9	...	1·5	...	1·0
Cholera	·3	...	1·9	·7	·5	·4	...	...	·1	·5	·2	...	·4
Small-pox	...	...	...	·2	·5	·9	1·2	·8	·5	...	·1	3·4	·5
Enteric Fever	3·7	1·0	...	1·2	·5	·7	·9	...	1·0	...	·4	...	1·1
Malaria	22·3	26·0	154·2	257·7	93·8	158·1	160·1	89·3	27·0	74·5	31·8	223·0	108·2
Sandfly Fever	...	...	...	...	...	...	·9	...	...	...	...	...	·1
Pyrexia of uncertain origin ...	24·9	12·3	161·8	3·9	9·4	70·8	7·5	...	38·4	8·7	21·6	...	24·3
Tubercle of the Lungs ...	6·8	6·9	9·5	12·1	5·0	10·7	22·9	4·3	5·7	7·3	6·6	10·3	9·2
Pneumonia	2·6	5·2	14·0	8·6	6·4	19·1	14·3	13·5	5·5	11·9	2·0	27·4	9·0
Respiratory Diseases ...	11·0	10·8	21·6	37·3	21·5	34·9	25·1	25·5	17·5	47·1	22·4	56·6	24·6
Dysentery	18·2	24·3	306·5	175·6	44·0	27·2	41·8	16·3	41·6	62·6	22·9	111·5	55·6
Diarrhœa	9·0	14·3	81·9	112·6	41·7	39·0	12·2	15·1	40·8	20·6	11·8	32·6	38·0
Spleen Diseases	...	...	...	·1	·4	1·6	·5	...	·1	...	...	...	·4
Scurvy	·6	...	22·8	·2	...	·1	5·0	...	·5	...	...	...	1·1
Anæmia and Debility ...	4·6	4·2	13·3	21·1	8·1	18·2	14·7	7·4	4·3	8·7	2·8	29·2	10·6
Abscess, Ulcer and Boil ...	33·7	26·6	32·4	75·2	68·6	85·7	65·6	57·4	46·4	27·4	29·7	68·6	57·8
ALL CAUSES ...	279·2	248·3	1,040·6	1,050·0	477·3	701·0	501·4	417·7	436·7	452·5	354·0	813·0	540·2
IV.—DEATH RATE OF THE YEAR—													
Cholera	·26	...	1·27	·17	·26	·30	...	...	...	·46	...	...	·18
Small-pox	...	...	...	...	·05	...	...	...	·13	...	...	...	·02
Enteric Fever	·35	·19	...	·25	·21	·22	...	...	·25	...	...	...	·18
Malaria	·26	...	3·81	·91	·62	·52	·68	·26	·13	·91	1·06	1·72	·62
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	·09	...	...	...	·15	·07	...	...	·50	...	...	...	·09
Tubercle of the Lungs	3·89	4·24	2·54	2·90	1·85	3·93	4·29	1·53	2·14	1·83	1·89	3·43	2·94
Pneumonia	·78	·96	6·35	2·16	1·59	2·89	2·24	1·53	1·64	3·20	·35	3·43	1·80
Respiratory Diseases ...	·78	...	1·27	1·16	·67	·74	·97	·26	·38	·91	·24	...	·68
Dysentery	1·21	1·93	11·42	5·97	2·21	·96	1·36	·51	1·51	1·37	·59	3·43	2·16
Diarrhœa	...	·77	1·90	·83	·87	1·19	·78	·26	1·01	4·11	·24	1·72	·82
Hepatic Abscess	·43	...	...	·08	·05	...	·10	...	...	...	...	...	·08
Anæmia and Debility ...	·52	·19	1·90	·75	·15	·15	·29	1·02	...	...	·12	3·43	·35
Phagedæna, Slough and Gangrene.	...	...	·63	...	...	...	...	...	...	...	...	...	·01
ALL CAUSES ...	16·27	16·18	40·61	21·23	13·77	15·14	17·16	10·46	11·85	20·57	7·90	22·30	15·52

*Including Aden.

GENERAL POPULATION.

TABLE NO. XII.—*Provincial Birth and Death Statistics, 1913.*

Province.	Year.	Births.			Number of Deaths.			Ratio of deaths per 1,000 of population.			Highest Death-rate.		Lowest Death-rate.		Mean death rate during previous five years.			Number of death of males to every 100 deaths of females.
		Total number.	Ratio per 1,000 of population	Mean ratio per 1,000 of population during five previous years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Delhi	1912 ...	18,105	46·03	38.05	10,023	5,420	15,443	43·74	33.01	39.26	...	...	...	...	55·34	55.27	55·29	103·49
	1913 ...	17,801	44.84	...	9,864	6,013	15,877	44·23	35·06	39·29	...	...	...	...	...	...	...	106·11
Bengal	1912 ...	16,00,335	35·30	34·83	71,148	1,278,631	1,349,779	24·47	30·14	29·77	50·97	43·74	3·89	20·20	24·73	29·31	29·02	109
	1913 ...	1,529,921	33·75	35·27	72,442	1,259,426	1,331,868	24·91	29·68	29.38	44·84	38·85	4·79	20·51	24·08	29·10	28·78	108
Bihar and Orissa	1912 ...	1,458,295	42·52	39·09	35,892	1,027.536	1,063,428	29·97	31·04	31·01	72·43	40·24	4·56	20·02	32·24	35·39	35·28	107
	1913 ...	1,443,789	42·10	39·90	32,896	966,486	999,382	27·47	29·20	29·14	77·94	35·07	5·01	19·95	30.28	34·39	34·24	109
Assam	1912 ...	1,94,676	32·16	31·90	2,501	149,065	151,566	20·80	25·13	25·04	38·10	38·74	6·84	20·84	22·20	27·16	27·06	110
	1913 ...	2,00,075	33·06	32·09	2,549	164,830	167,379	21·20	27·79	27·66	31·84	34·08	5·47	20·98	21·95	27·72	27·61	111
United Provinces of Agra and Oudh.	1912 ...	2,125,585	45·38	39·36	106,037	1,294,770	1,400,807	34·36	29·56	29·91	81·13	47·38	16·82	20·09	47 82	43·12	43·43	109·84
	1913 ...	2,232,999	47·67	40·2	121,453	1,510,240	1,631,693	39·35	34·48	34·84	68·49	49·45	17·41	22·18	43·63	40·51	40·72	110·83
Punjab	1912 ...	876,125	45·3	41·5	54,473	460,563	515,036	31·94	26·12	26·63	79·24	33·58	6·75	19.02	43.53	42·63	24·71	109·9
	1913 ...	878,241	45·4	42·3	60,549	523,235	583,784	35·65	29·66	30·19	69·88	43·95	10·42	18·15	38·91	35·03	35·37	108·9
North-West Frontier Province...	1912 ...	75,653	37·1	35·7	4,347	43,402	47,749	22·73	23·46	23·39	39·95	27·01	6·21	20·26	28·13	27·98	27·91	113·8
	1913 ...	73,833	36·2	35.0	4,649	45,654	50,303	24·31	24·68	24·65	32·47	28·43	4·74	21·02	26·06	26·08	26·03	110·1
Central Provinces and Berar ...	1912 ...	671,298	48·24	46·38	58,280	531,005	589,285	47·61	41·84	42·34	88·37	68·09	20·33	27·15	41·85	33·29	34·04	109·33
	1913 ...	685,557	49·26	51·52	37,948	383,447	421,395	20·90	30·22	30·28	51·70	41.21	11·27	24·10	42·63	38·23	38·62	112·79
Madras Presidency	1912 ...	1,245,465	30·9	32·1	138,005	844,303	982,308	28·6	23·8	24·3	66·4	35·3	2·5	15·3	28·9	23·3	24·0	104·2
	1913 ...	1,288,618	32·2	32·1	126,409	730,242	856,651	26·2	20·8	21·4	61·9	26·2	4·3	6·8	28·9	23·4	24·0	103·6
Coorg	1912 ...	4,606	26·32	26·35	640	6,073	6,713	64·12	36·81	38·37	91·86	51·66	47·69	29·80	53·50	33·39	34·59	111·63
	1913 ...	4,529	25·88	26·70	475	5,384	5,859	47·69	31·63	33·48	67·06	38 22	36·05	24·63	36·75	31·00	33·04	117·40
Bombay Presidency ...	1912 ...	684,890	34.97	35·53	113,522	569,688	683,210	41·48	33·80	34·88	76·77	49·92	12·01	12·44	36·62	27·69	29·20	105·82
	1913 ...	684,803	34·96	35·92	104,545	416,994	521,539	32·90	25.41	26·63	93·00	38·56	8·27	9·77	37·23	28·14	29·61	107·04
Lower Burma	1912 ...	202,197	31·68	33·71	29,874	136,079	165,953	37·23	24 38	26·00	64·89	34·97	18·36	18·51	39·69	24·74	26·64	123
	1913 ...	202,606	31·74	33·47	26,388	124,090	150,478	32·89	22·24	23·58	54·71	31·50	12·77	15·79	38·78	24·69	26·46	123
Upper Burma	1912 ...	114,457	32·96	35·69	13,016	87,520	100,536	44·05	27·54	28·95	55·77	46·93	18·29	22·76	42·91	27·69	29·30	101
	1913 ...	118,790	34·20	35·56	11,602	84,248	95,850	39·26	26·51	27·60	59·26	38·70	19·79	20·51	43·79	28·26	29·81	99
Ajmer-Merwara	1912 ...	23,609	47·08	40·35	Not available		19,178	Not available		38·25	Not available		Not available				43·02	109·27
	1913 ...	21,556	43·19	41·86	Not available		12,960	Not available		25·85	Not available		Not available				42·93	112·60

TABLE NO. XIII.—*Births—1913.*

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Delhi	396,997	...	...	44·4	106·48	4·85	...
Bengal	45,329,247	41·64	20·51	33·75	106	4·37	...
Bihar and Orissa ...	34,290,633	48·16	34·65	42·10	104	12·96	...
Assam	6,051,507	40·17	29·23	33·06	107	5·40	...
United Provinces of Agra and Oudh	46,835,108	58·21	28·19	47·67	108·16	12·83	...
Punjab	19,337,146	53·5	21·9	45·4	109·7	15·2	...
North-West Frontier Province	2,041,077	39·8	33·8	36·2	126·5	16·4	...
Central Provinces and Berar	13,916,308	55·31	43·23	49·26	104·79	18·98	...
Madras Presidency ...	40,005,735	38·7	25·4	32·2	104·5	10·8	...
Coorg	174,976	33·61	18·77	25·88	100·84	...	7·60
Bombay Presidency ...	19,587,383	49·81	17·38	34·96	108·15	8·33	...
Burma ... Lower ...	6,382,847	41·17	18·87	31·74	107	8	...
Burma ... Upper ...	3,473,006	39·19	25·55	34·20	105	7	...
Ajmer-Merwara	501,395	49·41	41·21	43·19	110·50	17·34	...

TABLE NO. XIV.—*Deaths—1913.*

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of Deaths per 1,000 of population.			Death rate by Sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Delhi	396,997	6·82*	33,599*	...	..	39·99	36·93	43·86
Bengal	45,329,247	70,873	639	40·44	20·44	29·38	29·77	28·96
Bihar and Orissa ...	34,290,633	81,524	420	34·97	19·94	29·14	31·12	27·24
Assam	6,051,507	33,551	180	33·80	20·90	27·66	28·06	27·22
United Provinces of Agra and Oudh.	46,835,108	106,402	440	49·24	23·25	34·84	35·05	34·60
Punjab	19,337,146	96,654	200	44·8	18·3	30·2	28·7	32·0
North-West Frontier Province.	2,041,077	13,399	152	28·2	21·5	24·7	24·4	24·9
Central Provinces and Berar	13,916,308	99,823	139	40·57	24·30	30·28	32·23	28·35
Madras Presidency ...	40,005,735	126,585	316	40·3	16·9	21·4	22·2	20·7
Coorg	174,976	1,582	111	38·23	28·45	33·48	32·53	34·69
Bombay Presidency ...	19,587,383	122,978	159	36·97	13·27	26·63	26·46	26·80
Burma ... Lower ...	6,382,847	75,866	84	31·11	18.66	23·58	24·60	22·42
Burma ... Upper ...	3,473,006	35,792	97	39·45	20·96	27·60	28·60	26·67
Ajmer-Merwara ...	501,395	2,711	185	26·59	23·50	25·85	25·79	25·92

* Delhi city only.

TABLE NO. XV.—*Deaths in Towns and Rural Circles compared—1913.*

Province.	Number of registration circles.			Population.			Ratio of deaths per 1,000 of population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Delhi	7	1	8	171,526	225,471	396,997	35·06	44·23	39·99
Bengal	375	112	487	42,421,996	2,907,251	45,329,247	29·68	24·91	29·38
Bihar and Orissa ...	228	55	283	33,093,280	1,197,353	34,290,633	29·20	27·47	29·14
Assam ...	77	19	96	5,931,275	120,232	6,051,507	27·79	21·20	27·66
United Provinces of Agra and Oudh.	1,072	93	1,165	43,798,779	3,036,329	46,835,108	34·48	39·35	34·84
Punjab ...	404	128	532	17,638,694	1,698,452	19,337,146	29·66	35·65	30·19
North-West Frontier Province.	65	13	78	1,849,832	191,245	2,041,077	24·68	24·31	24·65
Central Provinces and Berar.	403	104	507	12,688,123	1,228,185	13,916,308	30·22	36·90	30·28
Madras Presidency...	231	269	500	35,174,340	4,831,395	40,005,735	20·8	26·2	21·4
Coorg ...	8	2	10	164,995	9,981	174,976	32·63	47·59	33·48
Bombay Presidency	247	113	360	16,409,709	3,177,674	19,587,383	25·41	32·90	26·63
Burma... Lower ...	231	41	272	5,580,459	802,388	6,382,847	22·24	32·89	23·58
Burma... Upper ...	120	18	138	3,177,526	295,480	3,473,006	26·51	39·26	27·60
Ajmer-Merwara ...	Not available		23		Not available	501,395	Not available		25·85

TABLE NO. XVI.—*Deaths according to age—1913.*

Province.	Ratio per 1,000 of population.																	
	Under one year *		1—5 years.		5—10 years.		10—15 years.		15—20 years		20—30 years.		30—40 years		40—50 years.		50—60 years		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Delhi ...	283·55	264·12							Information not available.											
Bengal ...	217·41	201·24	42·49	37·72	12·44	12·65	10·22	9·63	13·66	15·80	14·91	18·31	18·54	20·40	25·26	23·69	41·37	38·90	79·98	69·06
Bihar and Orissa.	178·64	164·53	50·36	44·83	14·99	12·72	12·29	10·83	12·72	11·45	16·26	13·81	18·46	15·68	24·36	18·43	37·22	31·03	78·21	61·38
Assam ...	210·60	191·17	35·78	31·93	13·64	11·09	10·99	10·54	14·80	18·42	14·94	20·06	18·82	21·62	25·93	24·42	39·05	35·44	66·55	51·61
United Provinces of Agra and Oudh.	237·21	221·58	68·65	65·46	12·26	12·54	10·21	11·44	11·77	14·49	15·18	16·73	17·56	17·44	24·93	21·88	40·27	34·69	75·28	63·73
Punjab ...	217·61	216·13	60·97	64·17	10·84	12·14	7·81	10·44	8·23	10·95	9·36	12·06	11·16	14·13	15·90	15·45	23·73	23·44	62·39	65·82
North-West Frontier Province.	176·40	175·17	41·0	39·6	9·9	10·6	8·0	10·1	9·8	14·9	10·2	10·8	12·5	15·3	18·6	19·6	25·6	27·9	58·5	63·5
Central Provinces and Berar.	246·04	214·94	54·26	46·26	11·30	10·13	7·04	7·13	9·71	10·23	10·31	10·48	12·21	11·43	18·19	13·25	29·51	24·12	66·26	54·53
Madras Presidency.	189·31	170·30	29·5	28·2	8·1	7·6	5·5	5·6	7·8	10·3	9·2	10·5	11·7	11·0	15·9	12·4	25·7	21·2	64·2	62·0
Coorg ...	300·35	266·52	39·61	37·95	12·84	9·77	9·68	9·64	13·43	15·79	18·78	27·58	23·54	30·80	39·41	35·70	51·88	49·59	86·62	87·65
Bombay Presidency.	194·03	182·34	53·10	51·61	11·27	12·18	7·19	8·99	9·61	12·15	11·00	12·82	13·23	13·31	18·92	14·92	32·44	26·28	76·29	72·72
Burma { Lower	224·04	187·39	...	63·30	11·11	10·07	8·30	7·45	11·49	10·37	13·77	...	...	13·76	23·11	...	...	20·29	61·63	60·17
Burma { Upper	263·27	230·09	...	82·21	12·03	10·78	7·34	6·60	10·37	9·51	11·84	...	...	13·36	20·54	...	...	17·75	74·39	69·19
Ajmer-Merwara									Information not available.											
Total ...	192·50	196·87	50·43	4·41	12·40	11·44	9·02	9·19	11·01	12·86	12·51	14·93	16·36	14·84	20·96	18·86	35·30	27·83	71·73	63·94

* Calculated on the number of births during 1913.

TABLE NO. XVII.—*Deaths according to cause, 1913.*

Province.	Deaths per 1,000 of Population in 1913.								All causes.	Ratio of deaths in 1912.	Ratio of deaths in 1911.
	Cholera	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Delhi	·09	·43	·50	26·18	·65	9·17	·05	2·92	39·99	39·26	...
Bengal	1·74	·19	·02	21·30	·73	·25	·38	4·73	29·38	29·77	26·94
Bihar and Orissa	2·05	·11	1·06	18·18	·74	·17	·52	6·28	29·14	31·01	35·12
Assam	2·71	·46	...	14·43	2·62	·71	·30	6·41	27·66	25·04	23·61
United Provinces of Agra and Oudh ...	1·29	·17	2·30	23·88	·34	·47	·49	5·89	34·84	29·91	44·95
Punjab	·30	2·00	·92	17·15	·57	2·32	·36	6·56	30·19	26·63	34·05
North-West Frontier Province ...	·08	·70	·04	18·52	·15	·71	·38	4·06	24·65	23·39	23·30
Central Provinces and Berar	1·10	·46	·04	14·05	2·49	2·70	·49	8·95	30·28	42·34	34·67
Madras Presidency	·9	·4	·1	6·7	1·6	1·0	·3	10·4	21·4	24·3	23·1
Coorg	1·10	·23	·05	26·20	1·14	·41	·31	4·04	33·48	38·37	32·55
Bombay Presidency	·26	·50	·29	12·58	1·74	3·03	·39	6·83	26·63	34·88	28·35
Burma {Lower	·58	·28	·64	8·14	1·14	·79	·33	11·68	23·58	26·00	23·99
Burma {Upper	·18	·30	·07	8·93	·49	·62	·34	16·67	27·60	28·95	27·07
Ajmer-Merwara	...	·04	...	21·71	1·24	·63	·39	1·84	25·85	38·25	44·41

TABLE NO. XVIII.—*Total number of deaths by months—1913.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population 1913.	Ratio per 1,000 of population 1912.
Delhi ...	1,310	1,227	1,228	1,673	1,468	1,388	1,545	1,333	1,033	1,157	1,137	1,378	15,877	39·99	39·26
Bengal ...	114,996	97,984	10,417	117,240	94,058	82,483	84,756	81,893	111,575	110,063	139,533	186,870	1,331,868	29·38	29·77
Bihar & Orissa	64,881	61,323	80,092	90,247	75,637	80,044	105,199	94,125	96,403	80,597	81,151	89,683	999,382	29·14	31·01
Assam ...	12,135	9,874	9,944	11,029	13,898	14,648	14,320	14,356	16,237	18,451	16,549	15,938	167,379	27·66	25·04
United Provinces of Agra and Oudh.	112,281	115,624	147,023	178,100	168,015	154,327	149,322	130,692	113,895	107,050	120,344	135,020	1,631,693	34·84	29·91
Punjab ...	50,689	48,505	49,616	49,434	53,173	43,235	39,854	41,903	41,988	53,036	55,767	56,584	583,784	30·19	26·63
North-West Frontier Province.	4,743	4,174	4,348	3,410	3,738	3,545	3,104	3,566	3,690	4,828	5,685	5,472	50,303	24·65	23·39
Central Provinces and Berar.	33,873	27,600	31,634	39,334	40,187	34,072	32,383	36,534	36,462	38,278	36,581	34,457	421,395	30·28	42·34
Madras Presidency.	95,916	65,864	61,402	58,830	59,708	64,204	73,051	73,986	66,889	70,615	76,284	89,902	856,651	21·4	24·3
Coorg ...	519	389	515	593	626	759	541	461	372	360	387	337	5,859	33·48	38·37
Bombay Presidency.	45,391	36,742	40,870	41,538	39,246	35,156	39,830	44,359	45,818	50,904	53,332	48,353	521,539	26·63	34·88
Burma {Lower	13,092	12,247	11,266	11,443	10,746	11,417	13,95	14,523	13,650	12,245	12,860	13,044	150,478	23·58	26·00
Burma {Upper	8,750	6,752	6,915	8,257	6,515	6,700	8,893	9,152	8,571	7,853	8,589	8,903	95,850	27·60	28·95
Ajmer-Merwara.	1,283	1,174	1,385	1,294	1,137	1,024	979	959	810	804	954	1,157	12,960	25·85	38·25
TOTAL. ...	559,859	489,479	556,655	612,422	568,152	533,002	567,722	547,842	557,393	556,241	609,153	687,098	6,845,018	28·72	29·71

TABLE NO. XIX.—*Ratio of Deaths from all causes according to months 1913.*

Province.	ANNUAL* DEATH RATE PER MILLE FOR THE MONTH OF January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Ratio for the year.
Delhi	38·85	40·29	36·42	51·27	43·54	42·54	45 82	39·53	31·66	34·31	34·85	40·87	39·99
Bengal	29 87	28·18	28·68	31·47	24·43	22·14	22·02	21·27	29·95	28·59	37·45	48·54	29·38
Bihar and Orissa	22·28	23·31	27·50	32·02	25·97	28·40	36·12	32·32	34·20	27·67	28·79	30·79	29·14
Assam	23·61	21·27	19·35	22·17	27·04	29·45	27·86	27·93	32·64	35·90	33·27	31·01	27·66
United Provinces of Agra and Oudh ...	28·23	32·18	36·96	46·27	42 24	40·09	37·54	32·86	29·59	26·91	31·26	33·94	34·84
Punjab	30·86	32·70	30·21	31·10	32·38	27·20	24·27	25·51	26·42	32·29	35·09	34·45	30·19
North-West Frontier Province	27·36	26·66	25·08	20·33	21·56	21·13	17·91	20·57	22·00	27·85	33·89	31·57	24·65
Central Provinces and Berar	28·66	25·85	26·76	34·39	34·00	29·79	27·40	30·91	31·88	32·39	31·98	29·15	30·28
Madras Presidency	28·23	21·46	18·07	17·89	17·57	19·53	21·50	21·78	20·34	20·78	23·20	26·46	21·4
Coorg	34·92	28·98	34·65	41·23	42·12	52·78	36·40	31·02	25·87	24·22	26·91	22·68	33·48
Bombay Presidency	27·29	24·45	24·57	25·80	23·59	21·84	23·94	26·66	28·46	30·60	33·13	29·07	26·63
Burma ... {Lower	24·15	25·01	20·78	21·81	19·82	21·76	25·72	26·79	26·02	22·59	24·51	24·06	23·58
Burma ... {Upper	29·66	25·34	23·44	28·93	22·09	23·47	30·15	31·03	30·03	26·62	30·09	30·18	27·60
Ajmer-Merwara	30·13	30·52	32·52	31·40	26·70	24·85	22·99	22·52	19·60	18·88	23·15	27·17	25·85
India	27·66	26·77	27·50	31·25	28·07	27·21	28·05	27·07	28·46	27·48	31·10	33·95	28·72

* The ratios in the statement have been calculated with reference to the number of days in each month.

TABLE NO. XX.—*Deaths from cholera in the different provinces in India from 1882 to 1913.*

YEAR.	Delhi.	* Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.W.-Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations).	Mysore.
1882	...	182,352	...	24,055	89,372	39	...	11,932	3,573	23,604	31	7,904	7,177	...	289	1,327	1,562	150	893
1883	...	90,439	...	14,908	18,160	190	...	16,235	27,897	36,284	...	37,954	2,185	...	87	797	1,740	1,947	124
1884	...	134,421	...	22,276	30,143	614	...	149	87	75,476	...	13,804	5,515	...	227	1,297	1,018	2,479	330
1885	...	173,767	...	7,753	63,457	1,936	...	21,868	3,683	58,109	...	37,287	7,685	...	100	1,615	4,624	1,387	2,677
1886	...	118,368	...	20,188	34,565	12	...	16,679	976	12,417	...	167	4,027	...	765	173	290	499	10
1887	...	172,578	...	7,941	200,628	8,804	...	12,576	14,396	28,359	3	25,711	2,649	...	384	2,612	8,868	2,831	832
1888	...	111,391	...	9,693	18,704	14,938	...	921	305	58,677	2	36,500	15,982	...	13	32	191	2,057	1,015
1889	...	171,103	...	18,288	48,494	2,838	...	52,588	10,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	...	145,885	...	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	...	229,575	...	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	...	259,398	...	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	...	126,976	...	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	...	236,150	...	13,497	178,079	113	...	7,043	3,452	42,289	8	33,588	7,428	...	...	2	5,210	1,862	328
1895	...	177,087	...	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	...	226,824	...	17,042	69,147	5,146	...	52,985	12,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	...	196,247	...	33,240	44,208	622	...	57,131	10,122	143,445	106	57,109	8,538	...	19	1,496	13,202	1,039	4,248
1898	...	65,020	...	11,149	2,508	33§	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	...	107,678	...	8,380	8,142	1,816	...	76‖	541	29,082	...	8,579	4,942	2,050	1	498	...	...	123
1900	...	345,878	...	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	...	110,753	...	7,468	53,995	180	117	49	17	81,370	58	13,600	3,552	‡	50	6	72	1	11,351
1902	...	150,971	...	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	...	203,405	...	8,360	47,159	14,688	1,354	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	...	137,701	...	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	...	146,339	...	142,312**	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	...	192,596	...	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	...	205,702	...	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	413	1	4,972
1908	...	268,908	...	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,730	937	2,449
1909	...	56,711	...	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	403	1,421	164	1,629
1910	...	162,611	...	117,969	102,402	2,131	1,605	5,316	...	32,594	56	3,694	1,834	177	2	8	2,864	2	1,812
1911	...	124,560	...	39,248	117,689	1,260	12	2,998	...	58,174	6	5,817	2,595	1,596	50	85	1,054	803	210
1912	406	95,467	77,023	(b) 14,303	18,894	1,833	1,329	34,313	...	92,497	...	64,505	6,013	1,173	13	414	9,080	1,190	6,748
1913	37	78,898	70,379	16,407	60,427	5,811	175	15,286	...	37,730	102	5,134	3,704	635	...	4,085	2,823	1,322	8,062

* Excluding Calcutta from 1882 to 1892.
† Statistics from 1882 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1882-1900 included in the Punjab.
(b) Assam only.

TABLE NO. XXI.—*Deaths from cholera in British Provinces, by months, during the year 1913.*

Provinces.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1913.	1912.
Delhi ...	...	...	...	...	...	6	13	5	13	...	..	...	37	·09	1·03
Bengal ...	7,937	5,977	8,195	11,072	5,613	2,372	1,334	2,592	4,051	5,007	8,100	16,648	78,898	1·74	2·10
Bihar and Orissa.	219	276	948	2,506	6,219	11,037	18,351	12,294	7,111	5,709	4,129	1,580	70,379	2·05	2·24
Assam ...	675	257	424	783	2,363	1,439	1,010	1,114	2,595	2,861	1,547	1,339	16,407	2·71	2·36
United Provinces of Agra and Oudh.	43	48	252	5,293	16,510	15,044	10,162	7,680	3,536	1,118	624	117	60,427	1·29	·40
Punjab ...	...	...	...	44	235	325	1,055	2,885	1,247	20	...	...	5,811	·30	·09
North-West Frontier Province.	...	...	...	...	...	1	...	...	1	26	120	27	175	·08	·65
Central Provinces and Berar.	12	52	154	2,513	5,134	4,267	1,038	649	442	515	248	262	15,286	1·10	2·46
Madras Presidency.	11,484	4,361	2,607	1,582	973	1,937	3,980	2,866	1,720	1,000	1,211	4,009	37,730	·9	2·3
Coorg ...	1	...	28	41	71	51	...	...	...	...	...	...	192	1·10	...
Bombay Presidency.	244	47	12	383	1,531	601	804	851	413	154	34	60	5,134	·26	3·29
Burma { Lower	464	619	612	658	532	232	113	140	128	38	45	123	3,704	·58	·94
Burma { Upper	76	46	16	109	24	32	218	71	34	4	3	2	635	·18	·34
Ajmer-Merwara.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	·03
Total ...	21,155	11,683	13,248	24,984	39,205	37,344	38,078	31,147	21,291	16,452	16,061	24,167	294,815	1·24	1·71

TABLE NO. XXII.—*Details of the distribution and occurrence of Cholera during the year 1913.*

Province.	Mortality in 1913.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Delhi	·09	·26	·10	·08	·42	...	...	July and September.
Bengal	1·74	2·18	2·16	1·71	11·17	4·78	8·30	December.
Bihar and Orissa	2·05	2·95	2·91	2·02	8·93	6·13	12·60	July.
Assam	2·71	2·86	1·16	2·74	16·50	4·36	5·28	October.
United Provinces of Agra and Oudh ...	1·29	1·45	1·38	1·28	5·77	4·02	10·82	May.
Punjab	·30	·19	1·00	·23	1·78	3·76	14·01	August.
North-West Frontier Province ...	·08	·58	·02	·09	·29	·20	·12	November.
Central Provinces and Berar ...	1·10	·90	·78	1·13	4·79	4·77	11·50	May.
Madras Presidency	·9	1·9	·9	·9	11·19	4·6	21·7	January.
Coorg	1·10	·31	·70	1·12	2·42	2·07	·80	May.
Bombay Presidency	·26	1·09	·20	27	1·92	7·61	9·19	May.
Burma { Lower	·58	·81	1·19	·49	3·48	2·39	13·15	April.
Burma { Upper	·18	·81	·09	·19	1·82	1·62	1·64	July.
Ajmer-Merwara	...	·03	...	...	...	...	...	...

TABLE No. XXIII.—*Small-pox mortality—1913.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
(a)—Deaths by months—															
January	6	780	159	307	547	8,508	357	409	1,380	1	874	127	110	...	13,565
February	17	1,028	244	346	771	8,551	235	633	1,201	4	1,451	169	89	...	14,739
March	20	1,539	563	345	921	6,863	174	1,033	1,244	9	2,149	217	161	1	15,239
April	55	1,700	724	393	1,191	4,256	101	1,076	1,270	4	2,160	576	330	8	13,844
May	40	1,058	700	392	1,254	4,636	135	895	1,181	10	1,164	280	192	9	11,906
June	4	889	492	328	960	2,658	126	605	2,085	3	567	169	116	2	8,004
July	9	630	279	233	637	1,438	76	439	1,142	1	418	93	36	...	5,431
August	7	364	202	96	225	719	50	264	1,211	...	220	69	5	...	3,431
September	3	327	129	73	123	345	37	155	1,180	1	159	33	4	...	2,569
October	1	165	93	160	136	197	29	139	1,138	5	143	17	2	...	2,164
November	5	195	131	68	354	336	35	301	1,206	1	232	11	2	...	2,777
December	5	387	219	113	1,037	280	66	467	1,564	2	337	3	6	...	4,486
Total ...	172	9,062	3,935	2,794	8,156	38,687	1,421	6,416	14,802	41	9,833	1,763	1,053	20	98,155
(b)—Annual death ratios :—															
Ratio per 1,000 of population, 1913.	·43	·19	·11	·46	·17	2·00	·70	·46	·4	·23	·50	·28	·30	·04	·41
Ratio per 1,000 of population, 1912.	1·31	·18	·06	·77	·07	1·57	·99	·33	·4	·30	·32	·96	·53	6·08	·37
Difference ...	−·88	+·01	+·05	−·31	+·10	+·43	−·29	+·13	...	−·07	+·18	−·68	−·23	−6·04	+·04
Mean ratio per 1,000 during 1908-1912.	·34	·33	·35	·53	·39	·72	·50	·36	·5	·50	·24	·51	·19	1·82	·41
Difference ...	+·09	−·14	−·24	−·07	−·13	+1·28	+·20	+·10	−·1	−·27	+·26	−·23	+·11	−1·78	...
II.—District mortality excluding towns :—															
Number of districts affected.		26	20	8	47	28	5	24	24	2	26	16	11		237
Highest district ratio ...		·91	·50	1·03	1·42	4·40	1·62	2·10	1·1	·54	3·37	2·23	1·02		4·40
Name of that district ...		Dacca	Monghyr	Kamrup	Jhansi	Ferozepore.	Hazara	Buldana	Coimbatore.	Nanjaraj patna Taluk.	West Khandesh.	Kyaukpyu.	Shwebo		Ferozepore.
Lowest district ratio ...	Not available.	·001	·002	·006	·004	·11	·07	·02	·1	·48	·004	·01	·04	Not available.	·001
Name of that district ...		Khulna	Ranchi	Cachar	Fyzabad	Kangra	Bannu	Murwara	Vizagapatam.	Kiggatnad Taluk.	Ahmedabad.	Pyapon	Minbu		Khulna.
Number of districts without mortality.		...	...	...	1	...	...	...	...	3	...	3	...		7
District death rate per 1,000 of population.		·19	·11	·46	·16	2·04	·73	·46	·4	·25	·49	·24	·26		·4 *
III.—Town mortality:—															
Number of towns affected		46	26	6	62	112	11	57	120	...	55	19	11		525
Highest town ratio ...		3·21	·82	·88	7·19	10·29	3·93	6·61	3·8	...	4·41	6·85	2·23		10·29
Name of that town ...		Hooghly and Chinsura.	Bhagalpur	Gauhati	Kiratpur	Dasuya	Buffa	Mandla	Chittoor	...	Poona	Kyaikto	Pyawbwe		Dasuya.
Lowest town ratio ...	Not available.	·02	·02	·18	·02	·06	·09	·05	·02	...	·00	·06	·05	Not available.	·00
Name of that town ...		Garden Reach.	Arrah	Tezpur	Agra	Waziarabad.	Bannu	Bilaspur	Negapatam.	...	Ahmedabad.	Pegu	Pokokku		Ahmedabad.
Number of towns without mortality.		66	29	13	31	16	2	47	149	2	58	22	7		442
Town death rate per 1,000 of population.		·21	·15	·22	·42	1·59	·37	·44	·3	...	·55	·55	·77		·47*
IV.—Infantile mortality :—															
Children under one year...		913	892	675	2,936	12,146	395	2,314	6,674	3	2,922	126	62	6	30,064
Children 1—10 years ...		2,007	1,652	915	4,352	18,534	719	2,827	4,617	4	5,544	211	237	14	41,633
Percentage of children in total small-pox mortality.	Not available.	32·22	64·65	56·91	89·36	79·30	78·40	80·13	76·28	17·07	86·10	19·12	28·40	100·00	73·04

* Excluding Ajmer-Merwara and Delhi.

TABLE No. XXIV.—*Fever mortality—1913.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	855	80,742	41,732	6,297	79,373	26,679	3,485	16,025	27,110	431	22,828	5,131	3,283	1,084	315,049
February	763	69,274	38,183	5,281	78,554	24,567	3,068	12,875	19,911	314	18,620	4,379	2,238	976	279,003
March	773	76,347	46,786	5,362	88,713	24,494	3,104	14,632	19,429	377	19,533	3,760	2,114	1,173	306,597
April	1,046	80,930	55,652	6,064	110,717	24,029	2,462	18,619	19,867	411	19,410	3,698	2,676	1,118	346,699
May	986	68,481	49,525	7,042	114,277	27,707	2,720	27,908	20,110	422	17,462	3,518	1,965	949	333,073
June	903	61,590	47,241	8,351	107,234	24,038	2,551	14,274	21,323	583	16,158	3,897	1,873	858	310,874
July	990	64,678	59,275	8,588	104,222	21,988	2,264	14,250	22,920	446	17,541	4,979	2,668	803	325,612
August	910	61,366	55,795	8,036	90,207	22,235	2,564	16,595	24,157	392	19,231	5,179	2,757	827	310,251
September	682	83,394	61,005	7,807	80,947	24,904	2,738	16,925	21,698	315	20,315	4,581	2,717	659	328,487
October	797	81,841	53,585	8,314	78,520	35,338	3,831	19,171	22,165	297	23,643	4,166	2,556	672	334,896
November	776	103,193	56,293	7,956	89,418	37,996	4,542	18,267	23,355	319	27,332	4,339	2,979	814	377,579
December	911	133,710	58,483	8,261	96,273	37,729	4,472	15,993	25,979	277	24,446	4,329	3,176	953	414,992
Total ...	10,392	965,546	623,556	87,359	1,118,455	331,698	37,801	195,534	268,024	4,584	246,319	51,956	31,002	10,886	3,983,112
B.—Annual death ratios: —															
Ratio per 1,000 of population, 1913.	26·18	21·30	18·18	14·43	23·88	17·15	18·52	14·05	6·7	26·20	12·58	8·14	8·93	21·71	16·71
Ratio per 1,000 of population, 1912.	24·63	21·16	18·80	12·94	20·66	14·22	16·11	19·41	7·6	32·56	14·62	8·35	9·41	27·77	16·49
Difference ...	+1·55	+·14	−·62	+1·49	+3·22	+2·93	+2·41	−5·36	−·9	−6·36	−2·04	−·21	−·48	−6·06	+·22
Mean ratio per 1,000 during 1908-1912.	31·06	20·45	21·42	14·80	29·58	20·46	19·21	18·19	7·8	28·70	12·11	8·93	8·67	30·42	19·36
Difference ...	−4·88	+·85	−3·24	−·37	−5·70	−3·31	−·69	−4·14	−1·1	−2·50	−·53	−·79	+·26	−8·71	−2·65
II.—District mortality excluding towns :—															
Number of districts affected.	Not available.	26	20	8	48	28	5	24	24	5	26	19	11	Not available.	244
Highest district ratio ...		30·31	25·59	29·73	43·92	25·40	25·28	22·21	16·0	31·28	27·00	15·81	16·99		43·92
Name of that district ...		Dinajpur	Purnea	Goalpara	Meerut	Karnal	Kohat	Damoh	Vizagapatam	Mercara Taluk.	Broach	Thayetmyo.	Mandalay.		Meerut.
Lowest district ratio ...		12·32	6·93	10·74	14·16	9·60	17·88	5·85	2·2	22·18	5·27	2·37	4·80		2.2
Name of that district ...		Howrah	Puri	Sibsagar	Ballia	Simla	Hazara	Buldana	Bellary	Yedenalknad Taluk.	Belgaum	Manbin	Myingyan.		Bellary.
Number of districts without mortality.		...	...	...	...	...	...	...	...	...	...	...	...		
District death rate per 1,000 of population.		22·16	18·48	14·53	24·11	17·31	19·08	14·45	7·0	26·92	13·28	8·69	9·38		17·28*
III.—Town mortality :—															
Number of towns affected	Not available.	112	55	19	93	128	13	104	261	2	113	41	18	Not available.	959
Highest town ratio ...		32·47	27·22	17·85	45·14	41·19	16·53	29·13	24·9	18·05	37·70	16·79	21·81		45·14
Name of that town ...		Kurseong	Gaya	Nowgong.	Shikarpur.	Gohana	Kohat	Harda	Tiruvottiyur.	Virajendrapet.	Ratodero	Tavoy	Minbu		Shikarpur
Lowest town ratio ...		2·09	2·31	1·36	7·16	1·37	2·45	1·00	·1	11·96	·57	1·37	2·10		·1
Name of that town ...		Asansol	Daudnagar.	Hailakandi.	Mirzapur. Bindhachal.	Rewari	Becketganj Khwajaganj.	Deulgaon	Uravakonda.	Mercara	Deolali Cantt.	Myaungmya.	Myingyan.		Uravakonda.
Number of towns without mortality.		...	...	...	...	...	...	...	8	...	...	...	...		8
Town death rate per 1,000 of population.		8·73	9·97	9·56	20·17	15·48	13·15	9·90	4·6	14·23	8·94	4·28	4·06		10·35*

* Excluding Ajmer-Merwara and Delhi.

TABLE NO. XXV.—*Dysentery and Diarrhœa mortality—1913.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	18	3,062	1,912	908	850	696	20	2,679	8,225	13	2,720	424	107	66	21,700
February	5	2,451	1,583	723	728	612	13	2,112	5,652	12	1,804	512	92	55	16,444
March	6	2,637	1,985	640	922	716	15	2,431	4,966	23	2,339	445	74	61	17,261
April	15	2,870	2,602	806	1,276	748	18	2,924	4,329	27	2,497	640	109	54	18,915
May	15	2,428	1,804	1,025	1,549	1,047	35	2,361	4,181	27	2,690	617	100	55	17,947
June	26	1,895	1,952	1,353	2,021	995	38	2,356	4,562	42	2,518	760	159	50	18,727
July	52	2,003	2,580	1,373	2,285	939	22	2,971	5,543	17	3,551	1,030	263	66	22,695
August	41	2,189	2,630	1,449	1,693	993	28	4,085	5,610	7	4,415	917	308	55	24,420
September	22	3,032	2,640	1,738	1,270	963	15	4,101	4,622	8	3,607	693	155	39	22,905
October	29	2,858	1,826	2,330	1,048	1,143	35	3,526	5,176	5	2,980	421	129	29	21,535
November	16	3,371	1,825	1,956	1,285	1,167	34	2,692	5,654	9	2,515	401	84	35	20,974
December	13	4,406	2,210	1,568	1,307	1,046	36	2,422	7,291	8	2,295	398	120	55	23,075
Total ...	258	33,195	25,549	15,869	16,164	21,065	309	34,660	65,711	199	34,021	7,258	1,700	620	246,578
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1913.	·65	·73	·74	2·62	·34	·57	·15	2·49	1·6	1·14	1·74	1·14	·49	1·24	1·03
Ratio per 1,000 of population, 1912.	·73	·60	·75	2·19	·32	·51	·14	4·23	1·8	1·32	2·91	1·48	·65	1·10	1·22
Difference ...	—·08	+·13	—·01	+·43	+·02	+·06	+·01	—1·74	—·2	—·18	—1·17	—·34	—·15	+·14	—·19
Mean ratio per 1,000 during 1908-1912.	·70	·50	·95	2·57	·38	·64	·17	3·60	1·6	1·39	2·23	1·47	·77	1·12	1·14
Difference ...	—·05	+·23	—·21	+·05	—·04	—·07	—·02	—1·11	...	—·25	—·49	—·33	—·28	+·12	—·11
II.—District mortality excluding towns :—															
Number of districts affected.	Not available.	26	20	8	48	28	4	24	24	5	26	19	11	Not available.	243
Highest district ratio ...		5·81	4·34	3·89	7·24	4·07	·35	8·16	5·2	1·97	4·22	2·10	·76		8·16
Name of that district ...		Howrah	Puri	Lakhimpur.	Garhwal	Rawalpindi.	Dera Ismail Khan.	Akola	Nilgiris	Padinalknad Taluk.	Sholapur	Akyab	Pokokku		Akola
Lowest district ratio ...		·01	·01	·33	·01	·04	·01	·18	·1	·20	·01	·07	·13		·01
Name of that district ...		Dinajpur	Purnea	Goalpara	Sitapur	Hoshiarpur.	Peshawar	Bhandara	Vizagapatam.	Mercara Taluk.	Larkhana	Toungoo	Kyaukse		Sitapur
Number of districts without mortality.		...	...	...	...	...	1	...	...	...	...	...	...		1
District death rate per 1,000 of population.		·57	·70	2·62	·22	·46	·11	2·48	1·4	·78	1·56	·97	·40		·89*
III.—Town mortality :—															
Number of towns affected.	Not available.	111	54	17	86	117	11	103	249	2	107	40	17	Not available.	914
Highest town ratio ...		9·96	6·99	6·31	6·20	7·20	1·72	11·29	10·2*	11·05	11·00	4·92	2·43		11·29
Name of that town ...		North Barrackpore.	Gaya	Dibrugarh	Benares	Thanesar	Nawashahr.	Ner-Pinglai.	Madras	Virajendrapet.	Pandharpur.	Myanaung.	Monywa		Ner-Pinglai.
Lowest town ratio ...		·17	·08	·29	·05	·23	·09	·06	·1	4·79	·09	·13	·05		·05
Name of that town ...		Nawabganj.	Deoghur	Sunamganj.	Deoband	Zira	Nowshera-Kalan.	Umrer	Kuttur	Mercara	Godhra	Gyobingank.	Pokokku		Pokokku
Number of towns without mortality.		1	1	2	7	11	2	1	20	...	6	1	1		53
Town death rate per 1,000 of population.		3·10	1·86	2·79	2·09	1·76	·55	2·63	3·6	2·11	2·65	2·32	1·44		2·67*

* Excluding Ajmer-Merwara and Delhi.

TABLE No. XXVI.—*Plague mortality—1913.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL. 1913.	TOTAL. 1912.
BRITISH PROVINCES.														
Delhi	21	16	55	74	33	...	...	...	...	...	...	...	199	97
Bengal	23	76	226	325	137	110	50	26	5	...	5	1	984	1,995
Bihar and Orissa	2,913	4,766	10,981	8,305	1,071	326	798	488	485	233	1,422	3,796	36,383	58,324
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh.	7,963	13,968	31,185	29,205	5,593	1,553	1,430	1,262	760	1,057	3,573	10,134	107,683	114,945
Punjab	550	1,046	2,830	6,694	4,288	850	205	124	96	247	427	520	17,877	29,805
North-West Frontier Province.	...	...	...	...	13	4	2	1	61	...	...	1	82	1
Central Provinces and Berar	97	99	227	84	1	...	...	...	3	1	...	...	512	19,199
Madras Presidency ...	695	585	397	112	51	62	158	194	253	403	766	1,494	5,130	6,651
Coorg	...	1	...	...	...	4	2	3	...	...	...	...	10	9
Bombay Presidency ...	1,350	1,201	1,151	1,395	1,016	464	672	1,481	3,644	5,475	4,305	3,131	25,288	28,984
Burma ... Lower ...	366	759	689	469	165	250	406	292	240	94	75	260	4,065	2,564
Burma ... Upper ...	1	20	15	...	...	...	...	10	5	4		163	243	450
Ajmer-Merwara	...	...	...	...	...	...	...	...	...	...	...	...	...	13
Total ... 1913 ...	13,979	22,537	47,756	46,663	12,371	3,623	3,723	3,881	5,512	2,514	10,497	20,490	198,456	...
Total ... 1912 ...	43,388	59,615	69,075	46,656	15,170	2,380	1,011	1,963	3,822	4,377	5,665	9,917	...	263,037
NATIVE STATES, ETC.														
Bengal Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bihar and Orissa Native States	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh Native States.	84	222	391	330	63	13	1	13	7	4	31	49	1,188	1,162
Punjab Native States ...	123	214	477	730	317	246	19	10	17	18	59	97	2,327	5,273
Jammu and Kashmir States...	1	3	14	70	42	8	...	...	...	...	...	...	138*	365
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rajputana	382	439	500	638	177	32	13	...	58	58	47	134	2,478	5,373
Central India	8	11	25	14	9	...	...	18	22	32	10	24	173	5,282
Native States in Central Provinces.	...	...	...	...	...	...	...	...	...	...	...	...	...	352
Bombay Presidency Native States.	419	391	440	275	77	59	89	355	735	873	926	726	5,365	3,814
Burma Native States ...	...	...	2	14	...	...	...	...	...	...	...	...	16	2
Hyderabad State	409	248	157	32	5	12	75	156	221	248	1,273	554	3,370	15,943
Mysore	546	289	199	47	29	74	216	432	398	383	452	430	3,495	5,376
Bangalore, Civil and Military Station.	72	95	104	24	21	18	33	53	96	136	113	93	857	467
Madras Native States ...	...	...	...	...	...	...	...	...	...	...	...	6	6	43
Total ... 1913 ...	2,044	1,912	2,309	2,154	740	462	446	1,037	1,554	1,752	2,890	2,113	19,413	...
Total ... 1912 ...	11,810	6,701	5,826	3,683	2,459	594	266	957	1,968	2,883	3,421	2,883	...	43,451
GRAND TOTAL ... 1913 ...	16,023	24,449	50,065	48,817	13,111	4,085	4,169	4,918	7,066	9,266	13,297	22,603	217,869	...
GRAND TOTAL ... 1912 ...	55,198	66,316	74,901	50,339	17,629	2,974	1,277	2,920	5,790	7,260	9,084	12,800	...	306,488
Calcutta City	21	47	188	284	134	106	39	24	3	...	5	1	852	1,831
Bombay City	41	122	456	878	727	139	79	60	41	33	21	8	2,605	1,714
Madras City	...	...	...	...	1	1	...	...	...	...	...	1	3	1

* Jammu Province only.

TABLE NO. XXVII.—*Mortality from Respiratory Diseases—1913.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortalityby Provinces :—															
A.—Deaths by months—															
January	347	1,176	581	377	1,985	4,255	116	3,844	3,928	14	5,822	505	192	39	23,181
February	344	1,018	547	385	1,834	4,272	95	3,038	2,933	3	4,441	442	158	29	19,539
March	306	1,094	651	301	2,128	4,372	147	3,510	2,851	7	5,307	463	175	36	21,348
April	377	1,040	608	293	1,957	3,687	140	3,397	2,694	12	4,942	370	156	28	19,701
May	279	816	411	305	1,703	3,724	122	2,867	2,765	4	4,289	341	128	36	17,790
June	311	743	462	337	1,579	3,396	115	2,460	2,972	4	4,019	333	151	20	16,902
July	329	737	429	328	1,755	3,246	101	2,619	3,138	2	4,437	388	177	11	17,697
August	264	795	425	353	1,815	3,087	140	2,794	3,273	4	4,791	445	187	14	18,387
September	224	1,010	535	377	1,643	3,130	97	2,800	3,624	5	4,786	423	213	17	18,284
October	238	1,024	419	421	1,573	3,526	113	3,152	3,458	7	5,314	417	154	19	19,935
November	261	1,195	468	402	1,887	3,720	116	3,491	3,581	5	5,803	426	230	22	21,558
December	360	1,414	665	421	1,926	4,428	143	3,563	3,710	4	5,467	495	215	46	22,907
Total ...	3,640	12,036	6,141	4,300	21,845	44,943	1,445	37,535	38,327	71	59,418	5,048	2,136	317	237,229
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1913.	9·17	·26	·17	·71	·47	2·32	·71	2·70	1·0	·41	3·03	·79	·62	·63	1·00
Ratio per 1,000 of population, 1912.	8·54	·22	·18	·57	·40	2·14	·75	3·21	·9	·43	3·61	·82	·73	·79	1·04
Difference ...	+·63	+·04	−·01	+·14	+·07	+·18	−·04	−·51	+·1	−·02	−·58	−·03	−·11	−·16	−·04
Mean ratio per 1,000 during 1908-1912.	9·29	·21	·19	·56	·43	2·33	·80	2·90	·9	·33	3·07	·89	·73	·60	·98
Difference ...	−·12	+·05	+·02	+·15	+·04	−·01	−·09	−·20	+·1	+·08	−·04	−·10	−·11	+·03	+·02
II.—District mortality, excluding towns :—															
Number of districts affected.	Not available.	26	20	8	48	28	5	24	24	2	26	19	11	Not available.	241
Highest district ratio ...		1·05	1·40	2·03	10·82	10·97	1·10	9·36	2·0	·11	10·16	·91	1·18		10·97
Name of that district ...		Howrah	Puri	Lakhimpur.	Hamirpur.	Gurdaspur.	Hazara	Saugor	Anantapur.	Padinalknad Taluk.	Kaira	Pyapon	Shwebo.		Gurdaspur
Lowest district ratio ...		·004	·0005	·09	·01	·004	·07	·17	·1	·02	·01	·01	·04		·0005
Name of that district ...		Noakhali	Champaran.	Goalpara	Sitapur	Multan	Kohat	Bhandara	Vizagapatam.	Nanjarajpatna Taluk.	Thar and Parkar.	Toungoo	Myingyan.		Champaran.
Number of districts without mortality.		...	...	...	...	...	...	...	...	3	...	...	...		3
District death rate per 1,000 of population.		·69	·15	·70	·27	2·03	·48	2·46	·8	·02	2·28	·37	·24		·76[a]
III.—Town mortality :—															
Number of towns affected		108	44	13	88	127	3	104	210	2	104	36	16		845
Highest town ratio ...		7·12	2·39	7·09	11·60	13·76	4·71	13·25	7·8	9·97	18·64	6·10	9·22		18·64
Name of that town ...		Manikatlla.	Revalganj.	Mangaldai.	Rath	Zaffarwal	Ranna	Amraoti	Coonoor	Virajendrapet.	Kaira	Shwedaung.	Toungdwingyi.		Kaira.
Lowest town ratio ...		·07	·07	·16	·05	·09	·16	·11	·05	4·79	·11	·15	·45		·05
Name of that town ...		Khulna	Daudnagar.	Habiganj	Deoband	Multan	Beckettganj, Khwajaganj.	Umrer	Bodinayakanur.	Mercara	Ashta	Nyaunglebin.	Pokokku		Bodinayakanur.
Number of towns without mortality.		4	11	6	5	1	...	...	59	...	9	5	2		102
Town death rate per 1,000 of population.		2·78	·72	1·67	3·27	4·96	2·90	5·10	1·8	6·71	6·93	3·74	4·67		3·61[a]

[a]Excluding Ajmer-Merwara and Delhi.

TABLE NO. XXVIII.—VACCINATION.

A. *Total Primary Vaccinations and Re-vaccinations, successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1913-14.*

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of person vaccinated by each vaccinator of the Special Staff.	Total cost of the Special Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccination.	Primary.	Re-vaccination.	Under one year.	1 to 6 years.		Rs.	Rs. a. p.
Delhi	11,459	4,472	98·23	61·09	9,902	989	2,274	2,973	0 3 8
Bengal	1,574,490	281,237	98·76	64·18	580,643	816,957	1,271	198,163	0 1 10
Bihar and Orissa	1,283,557	40,391	99·66	71·10	659,788	589,330	1,179	93,373	0 1 1
Assam	301,241	35,408	98·41	78·15	77,051	178,301	914	64,426	0 3 4
United Provinces of Agra and Oudh ...	1,532,218	128,602	96·08	72·44	1,013,150	394,371	1,802	201,559	0 1 11
Punjab	671,183	216,286	97·40	71·07	527,653	88,870	3,288§	133,731	0 2 10
North-West Frontier Province ...	145,840	19,013	99·01	91·22	88,899	36,777	4,268†	15,241	0 1 7
Central Provinces and Berar	522,718	99,658	97·85	65·11	407,151	86,269	2,019	84,241	0 2 3
Madras	1,527,112	150,584	91·8	80·5	613,154	629,984	1,983‖	337,686¶	0 3 8
Coorg	8,923	4,743	94·92	87·00	777	3,977	1,461	2,898	0 3 7
Bombay	711,115	73,385	98·73	55·86	517,594	116,937	1,726	353,910	0 8 9
Burma	426,177	92,291	96·55	65·31	102,311	197,994	1,820‡	204,873	0 7 6
Ajmer-Merwara	15,260	32	98·05	48·39	12,215	1,996	1,019	3,352	0 3 9
Total ...	8,730,984	1,146,102	96.95	69.66	4,601,286	3,142,752	1,623	1,706,426	0 3 1

* Excluding those the results of which were not known.
‡ Excluding the work done by private medical practitioners.
‖ Excludes average of work done by each medical subordinate.
** Excluding Dispensaries.
† Including vaccinations performed in Cantonments and Political Agencies.
§ Including vaccinations performed in Cantonments.
¶ Excluding Madras Presidency Circle.

B. *Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1913-14.*

Province.	Population.	Number of operations (primary and re-vaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small-pox.*	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Delhi	393,356	15,922	...	15,922	32·94	62·93	172	·43
Bengal	(a)43,471,942	1,764,442	90,985	1,855,427	37·83	33·39	9,062	·19
Bihar and Orissa	34,635,017	1,253,982	69,966	1,323,948	37·49	46·97	3,935	·11
Assam	7,059,857	335,325	1,324	336,649	45·59	27·28	2,794	·46
United Provinces of Agra and Oudh ...	46,835,108	1,660,191	629	1,660,820	32·79	54·08	8,156	·17
Punjab	19,566,432	884,351	3,118	887,469	38·52	67·42	38,687	2·00
North-West Frontier Province ...	2,910,899	164,709	144	164,853	53·72	76·35	1,421	·70
Central Provinces and Berar	13,916,308	618,345	4,031	622,376	40·05	73·14	6,416	·46
Madras	41,390,849†	1,677,651	45	1,677,696	35·34	37·03	14,802	·4
Coorg	174,976	13,442	224	13,666	68·50	11·10	41	·23
Bombay	22,641,910	775,654	8,846	784,500	29·62	57·15	9,833	·50
Burma	12,115,217	512,801	5,667	518,468	36·73	21·11	2,816	·29
Ajmer-Merwara	501,395	15,292	Not available	15,292	28·75	60·90	20	·04
Total ...	245,613,266	9,692,107	184,979	9,877,086	36·19	46·83	98,155	·41

* For the calendar year. † Excludes the population of the cantonments of Bangalore and Secunderabad.
(a) Excludes 2,011,184, the population of other municipalities except Calcutta.

EAST INDIA (SANITARY MEASURES).

REPORT

ON

SANITARY MEASURES IN INDIA

1914–1915.

VOL. XLVIII.

Presented to both Houses of Parliament by Command of His Majesty.

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TABLE OF CONTENTS.

SECTION I.

EUROPEAN ARMY OF INDIA.

PARA.		PAGE.
1.	Introductory	1
2.	Deaths from all causes	2
3.	Enteric fever...	2
	Paratyphoid fevers	4
	Anti-enteric inoculation	5
4.	Scarlet fever	14
5.	Pyrexia of uncertain origin	14
6.	Malaria	15
7.	Sandfly fever	17
8.	Plague	18
9.	Cholera	18
10.	Small-pox	18
11.	Measles	18
12.	Diphtheria	18
13.	Dengue	18
14.	Rabies	19
15.	Beri-beri	19
16.	Dysentery	20
17.	Liver abscess	21
18.	Pneumonia	21
19.	Tubercle of the lungs	21
20.	Heat-stroke and Sun-stroke	21
21.	Poisoning	22
22.	Venereal	22
23.	Invaliding	25
24.	Officers	27
25.	Women	28
26.	Children...	29

SECTION II.

INDIAN ARMY.

27.	Introductory	31
28.	Admissions	31
29.	Deaths from all causes	31
30.	Northern and Southern Armies, Divisions	34
31.	Stations and Regiments	34
32.	Cholera	34
33.	Small-pox	35

PARA.		PAGE.
34.	Enteric fever	35
35.	Malaria	36
36.	Pyrexia of uncertain origin	39
37.	Sandfly fever	39
38.	Dengue	40
39.	Mediterranean fever	40
40.	Kala-azar	40
41.	Relapsing fever	41
42.	Beri-beri	41
43.	Plague	41
44.	Scurvy	41
45.	Tubercle of the lungs	42
46.	Pneumonia	42
47.	Dysentery	43
48.	Colitis	44
49.	Venereal diseases	44
50.	Suicides	45
51.	Guinea-worm disease	45
52.	Ankylostomiasis	45
53.	British Officers	45

SECTION III.

GENERAL POPULATION.

54.	Meteorology, crops and general conditions	47
55.	Births and deaths	47
56.	Chief diseases	48
57.	Cholera	48
58.	Small-pox	49
59.	Plague	49
60.	Fevers	49
61.	Respiratory diseases	49
62.	Dysentery and diarrhœa	50
63.	Delhi	50
64.	Bengal	50
65.	City of Calcutta	52
66.	Port of Calcutta	52
67.	Assam	52
68.	Bihar and Orissa	53
69.	United Provinces	55
70.	Punjab	57
71.	North-West Frontier Province	58
72.	Central Provinces	58

PARA.		PAGE.
73.	Madras	59
74.	City of Madras	60
75.	Port of Madras	60
76.	Coorg	60
77.	Bombay	61
78.	City of Bombay	62
79.	Port of Bombay	62
80.	Burma	63
81.	City of Rangoon	64
82.	Port of Rangoon	64
83.	Ajmer-Merwara	64
84.	Haj Pilgrimage 1913-14	65
85.	Deaths of civil officers and pensioners	65

SECTION IV.

JAILS OF INDIA.

86.	The prison population in 1914	67
87.	Total sickness and mortality rates	67
88.	Malaria	68
89.	Dysentery	68
90.	Tubercle of the lungs	69
91.	Cholera	69
92.	Enteric fever	69
93.	Bengal	69
94.	Assam	70
95.	Bihar and Orissa	70
96.	United Provinces	71
97.	Punjab	72
98.	North-West Frontier Province	72
99.	Central Provinces	73
100.	Bombay	73
101.	Madras	74
102.	Burma	74
103.	Andamans	75

SECTION V.

VACCINATION.

104.	Vaccination in India	77
105.	Delhi	77
106.	Bengal	78
107.	Bihar and Orissa	78
108.	Assam	78
109.	United Provinces	79
110.	Punjab	79
111.	North-West Frontier Province	81

PARA.		PAGE.
112.	Central Provinces	82
113.	Madras	82
114.	Coorg	83
115.	Bombay	83
116.	Burma	84
117.	Ajmer-Merwara	84
118.	Vaccination among troops	84

SECTION VI.

MEDICAL INSTITUTIONS.

i.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private-aided).

119.	India	85
120.	Delhi	86
121.	Bengal (excluding Calcutta)	86
122.	Calcutta	86
123.	Assam	86
124.	Bihar and Orissa	86
125.	Central Provinces	87
126.	United Provinces	87
127.	Punjab	88
128.	North-West Frontier Province	88
129.	Baluchistan...	88
130.	Burma	89
131.	Bombay	89
132.	Madras	89
133.	*ii.—Civil Hospitals and Dispensaries (State-Special, Railway and private non-aided)*	90
134.	*iii.—Lunatic Asylums.*	91
135.	Bengal	92
136.	Assam	92
137.	Bihar and Orissa	92
138.	United Provinces	92
139.	Punjab	92
140.	Central Provinces	93
141.	Bombay	93
142.	Madras	93
143.	Burma	93
	iv.—Medical Colleges.	
144.	Bombay	93
145.	Madras	94
146.	Punjab	95
147.	Bengal	95
148.	United Provinces	96

v.—*Medical Schools.*

PARA.		PAGE.
149.	Bengal	96
150.	Madras	97
151.	Bombay	98
152.	United Provinces	98
153.	Punjab	98
154.	Burma	98
155.	Bihar and Orissa	99
156.	Assam	99
157.	The X-Ray Institute of India	99

SECTION VII.

SANITARY WORKS.

158.	India	100
159.	Delhi	100
160.	Bengal	100
161.	Sanitary Board	103
162.	Assam	103
163.	Sanitary Board	104
164.	Bihar and Orissa	104
165.	Sanitary Board	104
166.	United Provinces	105
167.	Sanitary Board	105
168.	Punjab	105
169.	Sanitary Board	106
170.	North-West Frontier Province	107
171.	Central Provinces	107
172.	Sanitary Board	108
173.	Madras	108
174.	Sanitary Board	109
175.	Coorg	109
176.	Bombay	109
177.	Sanitary Board	110
178.	Burma	111
179.	Sanitary Board	111
180.	Military Works	111

Section VIII.

General Remarks.

Para.		Page.
181.	Laboratories	113
	Central Research Institute, Kasauli	113
	Bombay Bacteriological Laboratory	113
	King Institute, of Preventive Medicine, Madras ...	114
	Pasteur Institute, Kasauli	114
	Pasteur Institute of Southern India, Coonoor ...	115
	Pasteur Institute of Burma, Rangoon	115
182.	Indian Research Fund Association	115
183.	Publications	115
184.	Pilgrim Committee	116
185.	Deputation	116

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REPORT
ON
SANITARY MEASURES IN INDIA
1914-15.

SECTION I.
EUROPEAN ARMY OF INDIA.

(*From the Director, Medical Services in India.*)

1. The average strength of European troops in India during 1914 was 60,581, warrant officers, non-commissioned officers and men, as against 70,755 in 1913. During the period the health of the troops was fairly satisfactory. The following table, in which are incorporated comparative statements for the five year period 1909-13 and the years 1913 and 1914 epitomizes the chief facts regarding the health statistics of 1914 :—

India.

Period.	Average strength.	Admissions.	Deaths.	Invalids sent home.	Invalids finally discharged.	Average constantly sick.	Ratio per 1,000 of strength.					Average period of illness of each soldier, calculated on average strength.	Average duration of each case of sickness.
							Admissions.	Deaths.	Invalids sent home.	Invalids finally discharged.	Average constantly sick.		
1909-1913 ...	71,635	42,203	351	545	589*	2,283·78	589·1	4·90	7·61	8·27*	31·88	11·64	19·75
1913 ...	70,755	41,074	231	530	...	2,099·69	580·5	3·26	7·49	...	29·68	10·83	18·66
1914 ...	60,581	37,205	262	364	...	1,923·58	614·1	4·32	6·01	...	31·75	11·59	18·87

* From 1908-1912.

There were 37,205 hospital admissions from all causes during the year as compared with 41,074 in 1913, a decrease of 3,869. This fall in the admissions was due to the withdrawal of troops from India for field service in the last five months of the year. The admission rates per 1,000 of strength are 614·1 for 1914 and 580·5 for 1913.

The following table gives the incidence of sickness among European troops in the principal stations in India in 1914 (stations having an average annual strength of over 1,000):—

Stations.	Average strength.	Admissions.	Deaths.	Invalids sent home.	Average constantly sick.	Ratio per 1,000 of strength. Admissions.	Deaths.	Invalids sent home.	Average constantly sick.
Rangoon	1,029	516	8	14	37·30	501·5	7·77	13·61	36·25
Calcutta	1,118	983	10	10	55·17	889·2	8·94	8·94	49·35
Lucknow	2,030	1,183	15	16	53·81	577·1	7·32	7·80	26·25
Meerut	1,605	1,183	13	1	59·93	737·1	8·10	·62	37·34
Ambala	1,725	1,186	8	15	52·45	687·5	4·64	8·70	30·41
Sialkot	1,126	892	1	8	29·17	792·2	·89	7·10	25·99
Rawalpindi	2,502	2,093	11	19	96·44	836·5	4·40	7·59	38·54
Nowshera	1,046	945	10	10	32·58	903·4	9·56	9·56	31·15
Peshawar	1,659	2,035	5	18	84·25	1,226·6	3·01	10·85	50·78
Karachi	1,162	895	11	18	43 95	770·2	9·47	15·49	37·82
Agra	1,015	660	7	2	30·42	650·2	6·90	1·97	29·97
Mhow	1,529	617	3	4	41·68	403·5	1·95	2·62	27·26
Jubbulpore	1,582	1,050	3	2	58·58	663·7	1·90	1·26	37·03
Secunderabad ...	2,590	1089	8	31	62·71	417·0	3·09	11·97	24·21
Poona	1,565	746	7	8	59·09	476·7	4·47	5·11	37·76
Colaba	1,242	821	9	5	49·37	661·2	7·25	4·03	39·75
Bangalore	1,759	653	4	10	28·87	371·2	2·27	5·69	46·41
Ranikhet	1,191	463	1	2	30·78	388·7	·84	1·68	25·84
Quetta	3,042	1,868	11	13	90·04	614·1	3·62	4·27	29·60
Aden	1,109	741	4	8	34·92	668·2	3·61	7·21	31·49

(Deaths from all causes in India).

2. There were 262 deaths as compared with 231 during the previous year, giving a ratio of mortality of 4·32 per 1,000 of strength against 3·26 in 1913.

The main causes of deaths were :—Pneumonia 17, heat-stroke 16, suffocation from submersion (accidental) 15, enteric fever 10, tubercle of lung 10, other tubercular diseases 4, appendicitis 8, dysentery 10, valvular disease of heart 12, various forms of poisoning 6, abscess of the liver 9, syphilis 4, cholera 11, malaria 10, pyrexia of un certain origin 3, and cerebral meningitis 5.

Enteric fever.

3. There were 97 admissions with 10 deaths as contrasted with 85 and 16, respectively, during 1913. This furnishes a ratio of 1·6 per 1,000 of strength for attacks, and a death rate of ·17 as contrasted with 1·2 and ·23, respectively, in 1913.

The garrisons responsible for the largest number of cases were Poona 16, Rawalpindi 14 cases and 1 death, Secunderabad 6 cases, Meerut 5 cases and 2 deaths, Bombay 5 cases, Belgaum 4 cases, Agra 3 cases and 2 deaths, Kuldana, Ambala, Peshawar, Kirkee and Quetta 3 cases each.

The following table shows the distribution of enteric fever, paratyphoid fever *A* and paratyphoid fever *B*, in the various Divisions:—

Divisions.	Enteric fever.		Paratyphoid A.		Paratyphoid B.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1st (Peshawar)	6	2	6	1	...	...
2nd (Rawalpindi)	22	1	2	...	...	...
3rd (Lahore)	8	2	6	...	...	...
4th (Quetta)	3	...	3	...	...	...
5th (Mhow)	2	...	12	1	...	...
6th (Poona)	30	...	3	...	3	...
7th (Meerut)	11	4	10	...	6	...
8th (Lucknow)	3	1	23	1	...	...
9th (Secunderabad)	10	...	7	...	...	...
Aden Brigade	1	...	...	...	...	...
Troops on the march	1	...	...	...	...	...
Total ...	97	10	72	3	9	...

It will be seen that the 2nd (Rawalpindi) and 6th (Poona) Divisions had the largest number of cases of enteric fever, while the 8th (Lucknow) and 5th (Mhow) Divisions yielded nearly half the cases of paratyphoid fever A. The 6th (Poona) and 7th (Meerut) Divisions were responsible for the 9 admissions for paratyphoid fever B.

The source of origin of the cases of enteric fever occurring in the Rawalpindi Division could not be traced. Seventeen out of these 22 cases had been inoculated. Six of the cases occurred in the 21st Lancers: this regiment yielded 8 cases in 1913 and had been seriously affected with this disease in Egypt, prior to its arrival in India. The cases occurred in the months of January, April, May, June and July and in no case could any connexion be discovered with any previous case. All recovered.

There were 30 cases of enteric fever in the 6th (Poona) Division; 16 occurring at Poona, 3 at Kirkee, 5 at Bombay, 4 at Belgaum, and one each at Deolali and Ahmednagar. All recovered. Of the 16 admissions in Poona the 2nd Dorsets were responsible for 7 cases, the 2nd Cameron Highlanders for 6, the Oxford and Buckinghamshires for 2 and the 1st York and Lancashires for one. The increase in the incidence of this disease in the Poona Division is more apparent than real, being due, no doubt, to more accurate laboratory diagnosis. The fact that there were 27 admissions for pyrexia of uncertain origin at Poona in 1913 against none in the year under report is instructive. The source of infection could in no case be traced and in no instance could it be attributed to a carrier. The cases were all of a mild type and ran an uneventful course to recovery. All the men affected had been previously inoculated.

Secunderabad reported 6 admissions and no deaths. In 1913, 90 men of the 2nd King's Shropshire Light Infantry remained uninoculated but as the result of lecture and representations 87 of these men were inoculated by June 1914.

Meerut reported 5 admissions with 2 deaths; the source of infection is unknown. It is interesting to note that the three men who had been protected by inoculation recovered while the 2 uninoculated died.

Colaba (Bombay) had 5 admissions and no deaths; 4 had been inoculated. Belgaum reported 4 admissions; all recovered.

There were 3 cases in Peshawar among the men of the King's Liverpool Regiment. One case was originally admitted for heat-stroke, with a rectal temperature of 108°. Respirations were very rapid, but not stertorous and the patient was not unconscious. On taking a blood culture the *Bacillus typhosus* was isolated in pure culture. No relapse or complications occurred and the patient recovered.

Three cases occurred in Ambala with one death, all the men had been inoculated. In these cases also no history could be obtained to throw any light on the manner in which they had contracted the disease.

From almost every station where enteric fever occurred the medical officers report that the source of origin could not be traced definitely. The difficulty in finding the source of infection is being enhanced every year with the progressive decrease in the incidence of the disease and by the fact that the cases now tend to occur sporadically instead of epidemically.

Paratyphoid fevers A and B.—There were 81 admissions with 3 deaths during the year against 79 cases with 2 deaths in 1913, giving ratios of admissions and deaths of 1·3 and ·05 and 1·1 and ·03, respectively. Of the 81 cases 66 were protected by inoculation against *B typhosus*. The following stations furnished the largest number of cases, Fyzabad 13 admissions with 1 death, Meerut 7 admissions, Ranikhet, Mhow, Kamptee and Bangalore 5 admissions each.

In the Fyzabad cases, the cause of the disease is stated to be uncertain, but the incidence synchronised with the onset and prevalence of hot dry winds when flies are particularly troublesome. Each case was thoroughly investigated and the grouping of cases received special attention, but all effort to trace the source of infection was unsuccessful. The report appears to show that a certain number of cases will occur unless the men are protected by inoculation against both enteric and paratyphoid fevers. For instance, 318 men of the Leinster Regiment were inoculated at Fyzabad with anti-paratyphoid *A* vaccine in December 1913 or early in 1914 with the result that none of them were infected up to the time they left for Europe with their regiment. The only death here was due to perforation on the 7th day after admission. An operation was performed but this did not succeed in saving the patient's life.

In the Ranikhet cases the infecting bacillus was isolated from blood cultures taken between the 5th and 7th day of the disease. The identity of the organism was in each case confirmed at the Enteric Convalescent Depôt, Naini Tal. These cases came from different parts of the cantonment and at considerable intervals. Their origin could not be traced.

In all the five cases at Mhow the bacillus was isolated from the blood and this finding confirmed at Naini Tal. In one patient the disease was very severe; he

had four relapses but finally recovered after the use of an autogenous vaccine. All the men affected had been inoculated against enteric.

In Kamptee all the 5 cases occurred early in the year amongst the East Yorkshire Regiment. They were attributed to infection from the Indian cooks, two of whom were found to be "carriers".

Three cases ascribed to paratyphoid fever occurred in Peshawar during the period under review. In one, which proved fatal, the identification of the causal organism was doubtful. The Divisional Laboratory, Peshawar, stated it was *B. paratyphosus A*. The Central Research Institute, Kasauli, classed it as *B. paratyphosus B*. The Enteric Fever Convalescent Depôt Laboratory, Naini Tal, said it was a paratyphoid bacillus, but of neither the common strains *A* or *B*.

Anti-enteric Inoculation.—Anti-enteric inoculation continues to make satisfactory progress, over 94 per cent. of all European troops in India have been inoculated. The following table shows the state of inoculation on the last day of June 1914:—

Branch of Service.	Number of inoculated men who have not had enteric fever.		Number of inoculated men who have had enteric fever.		Number of uninoculated men who have not had enteric fever.		Number of uninoculated men who have had enteric fever.	
	1914.	1913.	1914.	1913.	1914.	1913.	1914.	1913.
Cavalry	4,122	4,747	97	85	212	387	38	53
Royal Horse Artillery	1,701	1,615	28	30	70	103	13	23
Royal Field Artillery	6,551	6,295	77	100	347	309	81	130
Royal Garrison Artillery ...	3,249	3,292	26	24	441	489	46	66
Ammunition Column	224	677	2	6	13	41	8	21
Infantry	46,374	46,936	389	437	1,404	1,663	210	276
Royal Engineers	29	24	...	...	40	45	5	6
Attached or unclassified troops ...	800	1,103	7	9	128	143	8	14
Staff and Departments	1,703	850	24	6	687	663	75	91
Total ...	64,753	65,539	650	697	3,342	3,843	484	680

Of the 97 cases of enteric fever 78 are reported to have been protected by inoculation and the remaining 19 were uninoculated men. There were 7 deaths among the inoculated and 3 among the uninoculated.

The ratios of admissions per 1,000 of inoculated strength for enteric fever was 1·20 and the ratio of deaths was ·11. Among the uninoculated the admission rate was 5·69 per 1,000 of non-inoculated strength and the death rate ·90. Combining enteric and paratyphoid fevers, the admission rate among the inoculated was 2·22 per 1,000 of strength against 10·17 among the uninoculated. The corresponding death rates were ·11 and ·90. By the comparison of these figures the value of inoculation is clearly indicated. Reinoculation is urged after two years, as it is certain that the protective efficacy of inoculation is lessened after that period, and this measure is now progressing steadily.

Enteric Convalescent Depôts.

The Naini Tal and Wellington Enteric Convalescent Depôts perform valuable work and provide the strongest lines of defence against carriers.

Naini Tal Depôt.—During the year one hundred and ninety-five convalescents arrived at the depôt, they were classified as follows and the numbers for the years 1910 to 1913 are shown for comparison:—

Year.	Convalescents from						Total.
	Enteric.	Para-typhoid *A.*	Para-typhoid *B.*	Pyrexia of uncertain origin.	Mediter-ranean fever.	Other disease.	
1914	49	60	6	78	...	2	195
1913	41	55	...	103	2	...	201
1912	89	83	4	82	...	...	238
1911	95	90	...	138	...	...	323
1910	143	27	...	...	...	...	170

Enteric.—Fifty-one cases were admitted. The diagnosis of two had to be changed, the first to catarrhal bronchitis, the second to paratyphoid *A*. Of the remaining 49 cases 13 were diagnosed bacteriologically (by isolation of the organism from the blood or excreta) and the remainder were diagnosed on clinical symptoms only; of these a few would appear to have been diagnosed on somewhat slender grounds.

Paratyphoid A.—Sixty-six cases were sent up diagnosed paratyphoid *A*; it was found that 8 of these had been diagnosed wrongly, on clinical grounds only or on faulty bacteriological findings. The diagnosis of all these has been altered to pyrexia of uncertain origin and this was reported to the various stations concerned.

One case admitted as pyrexia of uncertain origin was found to be excreting *Bacillus paratyphosus A*; the diagnosis was changed accordingly.

Paratyphoid B.—Of the six cases, four were from Ranikhet and had contracted the disease in the standing camp, one case contracted the disease in Manora camp, Naini Tal, and the sixth in Meerut.

Pyrexia of Uncertain Origin.—Altogether 72 cases were sent up as pyrexia of uncertain origin. The diagnosis in 2 cases was changed, the first to paratyphoid *A* (*vide* "carriers") the second to duodenal ulcer.

Attempts have been made to classify 78 cases of pyrexia of uncertain origin by a study of their clinical charts and symptoms.

The first group includes those who suffered from severe symptoms of typhoid character and whose fever ran a course of 14 days or more—40 cases.

The second group suffered from symptoms of a mild paratyphoid type and the fever lasted for less than 14 days—18 cases.

The third group consists of cases whose temperature charts showed relapses of fever, in several cases presenting a picture of a typical undulant fever—8 cases. Several attempts were made in this group to demonstrate agglutinins for the

Micrococcus melitensis but they were unsuccessful. There seems to be no doubt that many of these cases were relapses of typhoid or paratyphoid fever.

The fourth group consists of cases in which the origin of the fever was uncertain but which did not appear to belong to the typhoid or paratyphoid group. It probably includes such cases as dengue, malaria, and 3 days fever—7 cases.

Five suspected carriers were sent from Rawalpindi, as in the opinion of the sanitary officer, suspicious organisms were isolated from their fæces. It transpired that there were no grounds for suspicion but the men were kept under observation at the depôt and finally diagnosed as pyrexia of uncertain origin.

Carriers.—Four carriers were discovered during the year, one typhoid, two paratyphoid *A* and one paratyphoid *B*.

Typhoid Carrier.—This man arrived from Rawalpindi on the 11th January 1914: *B. typhosus* was isolated from his blood in November 1913. Shortly after his arrival the culture plates made from his fæces gave almost a pure culture of *B. typhosus*. He was treated with an anti-typhoid vaccine. After the 16th February the bacillus was not again found in his fæces. He was kept under observation for over 7 months when he was permitted to return to his station.

Paratyphoid A.—A lance-corporal of the 2nd Leinster Regiment arrived from Fyzabad on the 13th May 1914. *B. paratyphosus A.* was isolated from his blood on the 9th March 1914, and the same organism was isolated from his urine on the 25th May 1914: these were the only occasions on which the organism was found and he was finally discharged to duty on the 27th September 1914. A private of the Welsh Regiment arrived from Agra on the 20th November 1914 with diagnosed pyrexia of uncertain origin. The paratyphoid *A* bacillus was first isolated on the 4th December 1914 from his fæces and has appeared intermittently ever since. The man is still under observation. The diagnosis of his disease has been changed.

Paratyphoid B.—On 13th May 1914, a private of the 2nd Leicester Regiment arrived from Meerut, with the history of a positive blood culture on 9th March 1914. *B. paratyphosus B* was isolated from his fæces on the 27th August 1914 and from his urine on 3rd September 1914. No further recovery of the organism was made from his excreta and he was allowed to rejoin his depôt on the 5th December 1914.

Identification of cultures received.—Two hundred and three cultures were received in this Laboratory from the various Divisions in India, of which 199 were fully worked out and reported on, while the remaining four either failed to show a growth or were contaminated and in consequence no organism of the typhoid or paratyphoid group could be isolated.

Forty-nine strains were isolated from natives of India, and proved to be *Bacillus typhosus* 39, *paratyphosus A* 7, *paratyphosus B* 1, others 2.

Of the 155 strains isolated by blood culture, 20 did not come under the heading of the typhoid or paratyphoid group. One of these was a paratyphoid but could not be classified as either *A* or *B* and the opinion was expressed at the time that it was a *Bacillus suipestifer* (Aertryck). *B. alkaligenes fæcalis* occurred twice in the blood of one case. It was also isolated from the blood of two other cases. A coliform organism occurred in two other cases. The remaining 13 could not be classified

Twenty-eight cultures of organisms isolated from fæces and nine from urine were received.

Four thousand one hundred and seventy examinations of fæces and 4,419 examinations of urine were made in the Laboratory during the year.

A table showing the analysis of cultures sent to the depôt during the year is given below :—

Source of organism.	Opinion expressed by sender.				Laboratory opinion.			
	Typhoid.	Paratyphoid.		No opinion.	Typhoid.	Paratyphoid.		Others.
		A.	*B.*			*A.*	*B.*	
Blood	65	66	1	23	60	66	9	20
Fæces... ...	5	17	3	3	4	15	2	7
Urine	7	1	1	...	7	...	1	1
Other sources ...		2	...	2	3	2	...	2

Wellington Depôt.—Thirty-eight convalescents remained over from the preceding year. During the year 92 convalescents arrived at the depôt. These included five army officers, one naval officer, five men of the Royal Navy, one non-commissioned officer of the Territorial Force and one volunteer from Rangoon. They were classified as shown in the subjoined table. The figures of 1910, 1911, 1912 and 1913 are shown for comparison :—

Year.	Pyrexia of uncertain origin.	Paratyphoid *A.*	Paratyphoid *B.*	Enteric.	Total.
1910	...	1	4	79	84
1911	...	3	...	64	67
1912	3	5	...	45	53
1913	32	15	...	36	83
1914	23	14	2	53	92

It will be noticed that there has been an increase in the number of cases of enteric, with a corresponding diminution in the number of cases of pyrexia of uncertain origin as compared with the preceding year.

Of the 92 cases admitted to the depôt during the year, 40 came from the 9th (Secunderabad) Division, 47 from the 6th (Poona) Division, 4 from the 5th (Mhow) Division and one from the Burma Division (a volunteer). Of the 40 from the 9th Division 12 were cases of enteric, in 6 of which the organism was isolated by blood culture, in 4 from the urine, in one from the fæces and in one from rose spots.

B. paratyphosus A was recovered from 8 cases, in 7 by blood culture and in one from fæces giving a total of 20 or 50 per cent. of total success. The remaining 20 were cases of pyrexia of uncertain origin.

Taking the stations in the 9th Division, Bangalore furnished 13 cases of pyrexia of uncertain origin, 6 of paratyphoid *A* and 3 of enteric, making a total of 22. Secunderabad comes next with 2 cases of paratyphoid *A* and 6 of enteric, a total of 8. Madras furnished one case of pyrexia of uncertain origin and two cases of enteric ; Wellington 3 cases of pyrexia of uncertain origin, Bellary 2 cases of pyrexia of uncertain origin, St. Thomas Mount one case of enteric and Cannanore one case of pyrexia of uncertain origin.

Of the 47 cases from the Poona Division 38 cases were sent diagnosed as enteric, in only three of which had the organism been isolated ; in one from the blood, one from fæces, and one from both fæces and rose spots. The remaining thirty-five cases were diagnosed clinically, or by agglutination reactions. Four cases of paratyphoid *A* were sent up, in two of which the organism had been recovered by blood culture and two were diagnosed clinically. Two cases of paratyphoid *B* were received in which the organism had been isolated by blood culture. There were three cases of pyrexia of uncertain origin. This gives a total of 7 cases in which the organism was isolated, 14·8 per cent. of the total.

Taking the various stations in the Division it will be seen that Poona furnished 15 cases of enteric, all diagnosed on clinical symptoms alone *i.e.*, cases which in former years would have been returned as pyrexia of uncertain origin ; two cases of paratyphoid *B* diagnosed by isolation of the organism by blood culture ; one case of paratyphoid *A* in which the organism was isolated by the same means and two cases of pyrexia of uncertain origin.

Colaba furnished 12 cases of enteric, two of which were diagnosed by isolation of the organism from fæces and rose spots, the remaining 10 cases being diagnosed clinically. One of these, diagnosed as syphilis on arrival at the depôt, was transferred to Poonamallee and will be referred to again. Two cases of paratyphoid *A*, diagnosed clinically, came from this station ; the urine of one of them was found to harbour *B. paratyphosus A.* This case will be further considered under the head of carriers. One other case arrived from this station diagnosed as pyrexia of uncertain origin from which the paratyphoid *A* bacillus was isolated from the fæces, in the depôt. This case also will be referred to later.

Belgaum furnished 5 cases of enteric, the typhoid bacillus having been isolated from one of these by blood culture, the remaining 4 cases were diagnosed clinically : one case of paratyphoid *A* in which the organism was isolated by blood culture also arrived from this station.

Kirkee furnished 3 cases of enteric, all diagnosed clinically or by means of Widal's reaction.

Ahmednagar sent 3 cases of enteric, diagnosed clinically, from one of which *B. paratyphosus B* was isolated. This case will be referred to under the head of carriers.

Four cases arrived from the 5th Division, all coming from Mhow, two of these were enteric and two paratyphoid *A*. In all these cases the organisms had been isolated by blood culture.

No cases of enteric, paratyphoid *A* or *B* occurred in the depôt itself during the year. All carriers are isolated and have their food apart from the rest of the men. Twenty-three convalescents remain in the depôt.

Carriers.—A list of these is given below. Six remained from last year, who have all been discharged to duty, six were detected during the present year; four of these were discharged to duty and two still remain in the depôt.

Carriers in the depôt on 1st January 1914.

Place and date of onset of disease for which sent as convalescent to depôt.	Period under observation.	Type of carrier.	How finally disposed of.
Poona, 28th June 1913 ...	21st September 1913 to 31st March 1914.	Urine. Para. A ...	Returned to duty.
Wellington, 13th September 1913.	18th October 1913 to 31st March 1914.	Fæces. Para. A ...	Ditto.
Poona, 7th June 1913 ...	6th August 1913 to 5th May 1914.	Fæces. Typhoid ...	Ditto.
Kirkee, 5th August 1913 ...	10th September 1913 to 7th April 1914.	Urine. Para. A ...	Ditto.
Poona, 3rd August 1913 ...	31st October 1913 to 19th May 1914.	Fæces. Para. A ...	Ditto.
Bangalore, 26th September 1913.	16th November 1913 to 5th May 1914.	Fæces. Para. A ...	Ditto.

Carriers discovered in 1914.

Place and date of onset of disease for which sent as convalescent to depôt.	Period under observation.	Type of carrier.	How finally disposed of.
On H. M. S. "Swiftsure" 17th October 1913, transferred from Colaba.	17th January 1914 to 8th December 1914.	Fæces. Para. A ...	Returned to duty.
Ahmednagar, 4th February 1914.	16th April 1914 to 6th October 1914.	Fæces. Para. A ...	Ditto.
Colaba, 19th February 1914	25th April 1914 to 6th October 1914.	Urine. Typhoid ...	Ditto.
St. Thomas Mount ...	28th May 1914 to 15th December 1914.	Urine. Typhoid ...	Ditto.
Bangalore, 29th May 1914 ...	10th July 1914 to date.	Urine, Fæces. Typhoid	Still in depôt.
Bangalore, 15th July 1914 ...	9th October 1914 to date.	Urine. Typhoid ...	Ditto.

The following cases are of some interest:—

A seaman of H.M.S. "Swiftsure" arrived as a case of pyrexia of uncertain origin from Colaba. This man reported sick on his ship, on the 17th October 1913, while on his way from Polo Wet (Sumatra) to Colombo and was admitted to the sick bay on that day. He was transferred to the Station Hospital, Colaba, on the 31st of the month, for operative treatment as a case of appendicitis. He remained in Colaba until the 14th January 1914, and ultimately reached the depôt on the 17th January 1914 as a case of pyrexia of uncertain origin. Examination by Widal's reaction was made on arrival, and proved negative to all the enteric group. On the 1st of May after 49 examinations of his dejecta had been carried out, *Bacillus paratyphosus A* was isolated from his fæces. On the 14th August 1914 after another 49 negative examinations of his dejecta paratyphoid *A* was again isolated from his fæces. From that date up to the date of his discharge 8th December 1914, 60 further examinations of his dejecta proved negative. In all 158 examinations of his fæces and urine were made. Repeated agglutination tests gave negative results. This case exemplifies one of the great difficulties that beset one in the detection of "carriers," as there was no indication of the disease given from the examination of this man's serum by the agglutination test. He appears to have contracted the disease on the 4th October 1913 at Singapore, where the vessel took in water and where leave was given the men to go ashore.

The next case of interest is that of a private in the 1st Oxford and Buckinghamshire Light Infantry who arrived at the depôt from Ahmednagar as a case of enteric. There his blood culture had proved negative and attempts to isolate the organism from his excreta also proved a failure. His serum was sent to nine different laboratories for examination by Widal's test and from no two laboratories did the results agree. One laboratory, however, furnished a report that his serum only agglutinated *Bacillus paratyphosus B* and that in 1 in 100 dilution. As clinical symptoms such as "distended abdomen, rose spots, furred tongue, and slightly enlarged spleen" were present, the case was diagnosed as enteric and he was sent to the depôt as such, arriving on the 16th April 1914. On arrival an examination by Widal's reaction gave the following results:—*B.T.* 1 in 200, *Para. A*, 1 in 100, *Para. B*, 1 in 100. On the 21st of May after 18 examinations of his dejecta, *Para. B* was isolated from his fæces. Since that date 70 examinations of his fæces and urine were carried out with negative results. He was consequently discharged to duty on the 6th October 1914.

A private in the 2nd Loyal North Lancashire Regiment arrived at the depôt from Bangalore as a case of paratyphoid *A*. The organism had been isolated from his blood in the Brigade Laboratory, and this finding was confirmed at the depôt. Twelve days after his arrival on the 22nd July 1914, the typhoid bacillus was isolated from his urine and on the 31st of the same month paratyphoid *A* from his fæces. He passed the latter organism intermittently in his fæces from that date up to the 15th of September when he ceased to pass the organism. In spite of his urine having been examined 65 times since the 22nd July 1914, the typhoid bacillus has not been again isolated from it. An extract of this man's medical history sheet is of interest:—

Poona.—25th February 1911 to 6th March 1911 pyrexia of uncertain origin—10 days.

Poona.—22nd March 1911 to 21st April 1911 malaria—31 days.

Poona.—17th August 1912 to 7th September 1912—hepatitis—22 days (one week's pyrexia).

Poona.—10th October 1912 to 15th October 1912—pyrexia of uncertain origin—(6 days).

He was in South Africa from 1907 to 1908, in Mauritius 1908 to 1909, arriving in Poona in December 1909. He had been inoculated regularly every two years. He seems to have been a chronic intermittent typhoid carrier for some years.

A private in the 7th Hussars arrived at the depôt on the 9th October 1914 from Bangalore, as a case of pyrexia of uncertain origin. His blood culture proved negative there and three examinations of excreta also gave a negative result. On the 22nd December 1914 after 31 negative examinations at the depôt, the typhoid bacillus was recovered from his urine.

The three cases below other than "carriers" are also of interest :—

1. A rifleman from Kirkee, diagnosed as enteric fever on his chart alone, culture and agglutination tests being negative, was ultimately discovered to be a chronic dysentery carrier.

2. The second case is that of a private in the Nottingham and Derbyshire Regiment. This man was diagnosed as an enteric case by the Widal test with a dilution of 1 in 40. He was 101 days in hospital in Colaba, and arrived here with his trunk and limbs covered with a coppery secondary syphilitic rash. A Wassermann test was made by the Deputy Assistant Director of Medical Services (Sanitary) 9th Division, on the day following his arrival and proved strongly positive. This was confirmed by the Venereal Specialist at Poona. He was transferred to the station hospital, Poonamallee.

3. The last case to which attention is drawn is that of a lance-sergeant, attached to the Army Clothing Department, Madras, who was admitted on the 2nd November 1914. No clinician would have diagnosed this case as enteric from his chart or symptoms which were "general malaise, pains all over his abdomen of a cramping nature not localised, furred tongue and slight temperature". His blood culture proved negative. The reaction by Widal's test was positive 1 in 200 to the typhoid bacillus and negative to *Para. A*; he had been inoculated on the 8th March 1913. His fæces and urine were sent regularly to Wellington from Madras from the 12th November 1914 onwards, and after 11 negative examinations, the Deputy Assistant Director of Medical Services (Sanitary) succeeded in isolating the typhoid bacillus from the fæces in spite of the fact that the specimen had travelled over a distance of 300 miles and that at least 48 hours must have elapsed between the taking and the examination of the same, thereby allowing ample time for the outgrowth of the enteric bacillus by other organisms.

During the year a total of 11,398 plates of fæces and urine were examined in the depôt. A comparative statement of the work done in the depôt for the past 5 years is given below :—

Year.	Total arrivals.	Total Widal examinations performed.	Total plates examined.	Carriers detected.
1910	84	110	3,644	3
1911	67	101	7,183	2
1912	53	159	3,664	3
1913	83	192	6,196	8
1914	92	186	11,398	6

The table below gives the annual admission rate per 1,000 of strength for "enterica" during the last 5 years in all stations having an average annual strength of over 500 during 1914.

Stations.	1910.	1911.	1912.	1913.	1914.
Peshawar	7·9	3·0	·6	·6	3·6
Nowshera	6·1	6·4	1·9	...	1·9
Rawalpindi	5·9	·7	2·7	4·6	5·6
Gharial	2·4	...	...	1·4	...
Barian Camp	4·8	8·2	11·3	3·4	...
Sialkot	15·1	·8	1·9	7·9	1·8
Lahore Cantonment	9·7	4·5	3·8	1·7	3·2
Dalhousie	4·6	...	6·3	1·5	...
Multan	2·3	4·4	2·2	1·2	1·4
Ferozepore	1·0	1·0	...	...	...
Jullundur	1·6	...	...	...	...
Ambala	5·3	...	4·8	...	1·7
Dagshai	1·5	9·9	1·3	...	...
Meerut	2·3	1·8	3·2	1·7	7·5
Delhi	...	...	...	...	1·7
Agra	2·4	...	...	1·1	4·9
Bareilly	...	16·8	1·5	1·4	1·2
Ranikhet	6·0	·5	1·2	2·4	4·2
Chakrata	1·5	1·6	·9	1·7	...
Lucknow	4·2	15·4	5·5	9·3	4·4
Fort William	1·5	·8	4·8	·8	...
Dinapore...	...	...	...	...	...
Lebong	...	1·6	1·6	...	...
Allahabad	...	4·2	...	...	...
Cawnpore	...	...	1·0	1·1	1·2
Fyzabad	14·2	11·6	30·6	13·3	17·4
Quetta	2·2	3·5	·3	1·4	2·0
Karachi	3·9	4·4	...	·8	...

Stations.	1910.	1911.	1912.	1913.	1914.
Hyderabad	...	1·8	...	...	...
Mhow	6·9	2·7	1·1	2·2	4·6
Kamptee	14·4	3·4	1·0	4·2	6·4
Nasirabad	1·1	6·0	4·5	2·5	...
Jhansi	13·1	3·2	1·0	2·8	2·0
Jubbulpore	6·6	4·8	2·7	...	...
Poona	8·4	3·0	5·3	9·2	12·1
Kirkee	12·0	5·4	·9	2·6	3·4
Bombay	2·8	3·9	1·7	2·7	4·8
Deolali	...	...	...	...	...
Ahmednagar	1·7	2·9	1·0	1·8	2·4
Belgaum	8·0	14·0	3·7	5·6	5·3
Secunderabad	3·4	4·5	5·0	1·6	3·1
Bangalore	6·0	4·9	4·6	4·6	4·0
Madras	1·5	3·0	...	1·3	2·6
Wellington	1·9	4·3	3·4	1·0	...
Maymyo	...	...	...	...	...
Shwebo	...	...	...	...	...
Rangoon	·8	·9	...	...	...
Aden	2·9	...	3·3	·9	·9

Scarlet Fever.

4. Eight cases of scarlet fever were reported: there were none in the previous year. Four of these occurred at Poona, three at Peshawar, and one at Wellington. All recovered completely. The source of infection could not be traced.

Pyrexia of uncertain origin.

5. There were 650 admissions with 3 deaths returned under this head as contrasted with 1,101 admissions and no death in 1913. It is satisfactory to note that there has been a considerable decrease in the number of these admissions as it probably indicates that greater care and discrimination are being used in the diagnosis of fevers. The stations showing the greatest number of admissions were Lucknow 131, Fyzabad 61, Multan 49, Lahore 29, Karachi 30, Rawalpindi and Cawnpore 25 each, Mhow and Nowshera 20 each, Calcutta 19, Barrackpore and Ambala 17 each, Thayetmyo 16, Hyderabad (Sind) and Gharial 14 each.

The following table shows the admission rates for pyrexia of uncertain origin and malaria in the several divisions during the years 1913 and 1914 :—

Divisions.	Admissions per 1,000 of strength.			
	Pyrexia of uncertain origin.		Malaria.	
	1913.	1914.	1913.	1914.
1st (Peshawar)	5·9	12·3	274·6	416·0
2nd (Rawalpindi)	16·4	11·8	288·1	272·9
3rd (Lahore)	22·4	16·1	188·9	239·7
4th (Quetta)	14·0	11·9	142·8	241·8
5th (Mhow)	9·1	4·8	133·0	150·6
6th (Poona)	12·9	·5	90·3	134·4
7th (Meerut)	2·5	2·8	63·3	99·9
8th (Lucknow)	46·6	35·0	48·7	75·5
9th (Secunderabad)	2·4	2·8	46·8	56·7
Burma...	12·3	8·1	118·7	67·9
Aden Brigade	8·3	·9	21·2	201·1

The stations which have reported the largest number of cases of undesignated fevers recognise that under this head are included various pyrexial states which do not lend themselves to more accurate diagnoses. For instance, the officer at Lucknow states that of the 131 cases occurring there 23 were transferred to the enteric depôt at Naini Tal and the remainder were chiefly 7-day fever. Some were also probably malarial.

The Fyzabad report says :—In every case of fever admitted to hospital a blood film was taken and in every case of three days' duration a blood culture was made and repeated if negative and if the fever still continued. Also in some of the more protracted cases examination of the fæces was made. The result in every instance was negative. It is not possible to give a reason for this large number of admissions from this class of fever, yet their occurrence in the height of the hot weather suggests a possibility of some of the cases being heat-stroke with ill-defined signs and symptoms. There were 49 cases with one death in Multan, most of them being admitted in July, August, September and October. In each case the peripheral blood was repeatedly examined and malaria excluded. Some of them were probably due to thermic influence. In all the 30 cases at Karachi the blood was repeatedly examined but with negative results. With regard to the 29 cases at Lahore Cantonment, it is stated that all methods of bacteriological diagnosis were adopted but failed to reveal any cause.

Malaria.

6. Malaria continues to be one of the chief causes of inefficiency among British troops. It accounted for 9,862 admissions and 10 deaths as compared with 8,880 admissions and 9 deaths during 1913. The ratio of admissions per 1,000 of strength was 162·8 in 1914, and 125·5 in 1913. This increase in admissions was principally due to the disease occurring in epidemic form in several garrisons, notably in North-West India, but there is an almost general increase in the admission rate of all divisions and brigades.

The malaria admission and death rates, by divisions, for the two years are noted in the table given below :—

Divisions.	Ratios per 1,000 of strength.			
	1913.		1914.	
	Admissions.	Deaths.	Admissions.	Deaths.
1st (Peshawar)	274·6	...	416·9	1·47
2nd (Rawalpindi)	288·1	·29	272·9	...
3rd (Lahore)	188·9	·34	239·7	·14
4th (Quetta)	142·8	...	241·8	·21
5th (Mhow)	133·0	...	150·6	...
6th (Poona)	90·3	...	134·4	...
7th (Meerut)	63·3	...	99·9	·28
8th (Lucknow)	48·7	·23	75·5	...
9th (Secunderabad)	46·8	·13	56·7	·15
Burma	118·7	·32	67·9	...
Aden Brigade	21·2	...	201·1	...

In Rawalpindi there were 1,053 admissions as against 1,581 in 1913. The report shows that 241 were fresh infections and 812 relapses. Eighty-six were returned as malignant in type of which only 7 were fresh attacks. Blood smears were taken and examined in every case, and parasites were detected in 172 of the fresh infections and 446 of the relapses. The report goes on to say that parasites were not detected more frequently owing to the fact that prophylactic quinine was given twice weekly; all cases were kept under treatment with quinine for four months, after discharge from hospital. An officer of the Royal Army Medical Corps was appointed as special medical officer to investigate the cause of the prevalence of this disease in the station and the usual preventive measures were adopted to combat the epidemic.

Jubbulpore returned 477 admissions compared with 536 in the previous year. The arrival in the station in December 1913 from Karachi of a battalion, namely 1st York and Lancasters, highly infected with a mixed infection of malignant and benign tertian parasites, constituted a grave menace to the health of the garrison, and to prevent the Artillery Brigade from becoming infected, all the men of the former unit were given ten grains of quinine daily for one month and mosquito nets were used. As many infected men as possible were sent away to hill stations during the hot weather, preference being given to malignant tertian cases. A similar procedure was adopted in respect of the 2nd Cheshire Regiment, which was also badly infected, 400 being sent to Bhim Tal.

In Peshawar, there were 937 admissions as compared with 601 in 1913. Of

these 679 were benign tertian and 258 malignant tertian infections. The conditions in the Peshawar valley are extremely favourable to the spread of malaria, owing to the amount of irrigation both in cantonments and in a very large area of the district around and the tendency there is to waterlogging of the land after heavy rain. Anti-malarial measures were carried out.

There were 707 admissions in Quetta compared with 263 in 1913. The prevalence is attributed to the copious rainfall and the consequent plentiful supply of irrigation water in which anopheline mosquitos freely breed.

There were 464 admissions in Lahore Cantonment, as contrasted with 900 in 1913, 450 of these were benign tertian and 14 malignant tertian. Of the total 312 were fresh attacks and 152 relapses. Diagnosis was confirmed by the microscope in 327 cases. In 137 cases no parasite was found and these were diagnosed clinically. General prophylactic measures were carried out and a spleen examination was made among the children of followers; those with enlarged spleens were treated with quinine daily.

In Karachi there were 386 admissions as against 461 during the previous year. Of these 355 were benign and 31 malignant tertian, 268 being fresh infections and 118 relapses.

Sandfly fever.

7 The number of admissions for sandfly fever was 1,493 as contrasted with 2,047 in the previous year or a decrease of 554.

The greatest number of cases were returned from the undermentioned stations :—

Stations.	Average annual strength.	Admissions.	Ratio of admission per 1,000.	Months of maximum incidence.
Peshawar	1,659	460	277·3	July and September.
Nowshera	1,046	232	221·8	May, June and July.
Rawalpindi	2,502	76	30·4	May, June and July.
Ambala	1,725	66	38·3	September.
Agra	1,015	81	79·8	July, August and September.
Quetta	3,042	53	17·4	June and July.
Cawnpore	842	48	57·0	July.
Meerut	1,605	92	57·3	July and August.
Ferozepore	777	65	83·6	May, August and September.
Sialkot	1,126	60	53·3	August and September.
Aden	1,109	51	46·0	June and December.

The records show that this disease occurred practically all over the country. It is the cause of a great deal of inefficiency amongst the troops as the effects of the disease last long after the fever has disappeared, and there is also the fact that one attack does not render a person immune from other attacks.

Plague.

8. There were 3 admissions and 1 death during the year as against none in the previous year. Of these two occurred at Colaba (Bombay) and one at Kirkee, all being bubonic in type.

Cholera.

9. Cholera caused 23 admissions with 11 deaths as against 5 admissions with one death in 1913. Of the deaths 9 occurred in hospital and 2 outside. The largest number of cases in one unit (5) occurred among the men of the 2nd King's Own at Barrackpore. All recovered within 15 days.

Small-pox.

10. There were 12 cases with no death as compared with 14 cases and 1 death in the previous year. The cases were distributed as follows:—Bangalore 2, Bareilly 2, Cawnpore 2, Naini Tal 1, and Lucknow 5. In all these stations the disease was prevalent among the civil population. None of these men had suffered previously from small-pox and all had been vaccinated and revaccinated and bore good marks. The origin of the infection could not be traced.

The essential facts as to small-pox and vaccination for the last 5 years are given in the following table :—

Years.	Small-pox.		Number of Primary and Secondary Vaccinations.
	Admissions.	Deaths.	
1910	3	...	7,346
1911	1	...	6,726
1912	17	3	8,524
1913	14	1	8,981
1914	12	...	8,107

Measles.

11. There were 23 cases of measles with one death as contrasted with 20 cases and no death in 1913. These cases were distributed over 10 stations. The greatest number of admissions and the one death occurred at Quetta. Death was due to broncho-pneumonia which developed during convalescence.

Diphtheria.

12. There were 22 admissions for diphtheria in 1914 as against 7 in the previous year. These cases were scattered over 10 stations, Cawnpore with six cases giving the largest number of admissions.

Dengue.

13. This disease was responsible for 646 admissions as against 746 in 1913, giving ratios of 10·7 and 10·5 per 1,000 of strength.

The disease occurred epidemically in Calcutta and Dinapore where there were 266 and 167 cases, respectively. The rest of the cases occurred at Bombay 74, Cawnpore 40, Madras 31, Rangoon 21, Darjeeling 13, Barrackpore 12, Mandalay 7, Ambala 4, Benares, Lahore and Dum Dum 3 each and Lucknow 2.

The reporting officer at Calcutta remarks :— "It attacks units new to the station in epidemic form. One attack seems to confer complete (or almost complete)

immunity. One feature of this epidemic, not previously noticed, was the occurrence in some ten per cent. of cases of bleeding from the gums and nose and even intestinal hæmorrhage. Convalescence was rapid and there were no untoward sequelæ".

The Dinapore report says :— " The patients complained of frontal headache, pains in the back and limbs and sleeplessness. The symptoms came on suddenly with a temperature ranging between 102—103, which lasted between 5 and 7 days. Convalescence was fairly rapid. One attack appears to render the patient immune to a second attack. Many of the temperature charts showed a saddle-back appearance resembling that described by Rogers as occurring in seven day fever in Calcutta.

The cases at Cawnpore occurred sporadically and all recovered without sequelæ.

Rabies.

14. One admission and one death occurred under this head, as compared with two admissions and two deaths in 1913. The man was bitten by a monkey about 4 months prior to the attack. He died 24 hours after the appearance of symptoms. Ninety-seven men underwent anti-rabic treatment during the year.

Beri-beri.

15. This disease accounted for 47 admissions with 4 deaths during the year as against 43 cases and one death in 1913. The ratios of admissions per 1,000 of strength being 78 and 61, respectively. These admissions occurred at Lebong 27, Meerut and Dum Dum 6, each, Chakrata 4, Barrackpore 3 and Calcutta one. Of the 27 admissions which occurred at Lebong, 23 were due to relapses occurring among men who had been admitted for this disease in 1913; thus there were only four fresh admissions at Lebong as compared with 43 fresh admissions in the previous year. One of the members of the Commission which investigated the cause of this disease at Lebong in December—January 1913-1914, was detailed for duty at this station to see that the recommendations of the Commission were carried out and to observe their effects. The new scheme of dietary for the troops on the lines laid down by the Commission was inaugurated on April 17th, 1914. The results obtained by carrying out these recommendations were good, as the following table shows, in which is set forth the incidence of beri-beri at Lebong from January 1911 to October 1914, leaving out readmissions or relapses.

Months.	1911.	1912.	1913.	1914.
January	...	...	...	...
February	...	2	...	...
March	...	2	...	...
April	...	...	...	...
May	...	1	...	...
June	...	...	...	1
July	2	2	2	1
August	5	7	13	...
September	3	3	6	2
October	21	7	2	...
November...	15	2	9	...
December...	...	...	11	...
Total ...	46	26	43	4

From this table it appears that the main incidence of the disease coincides with the rains and further the following interesting facts have been elicited during this same season of the year :—

(1) That the troops here suffer generally from a loss of weight during this period. This loss of weight is marked in July and August and in every case the weight of the men is lowest in September.

(2) That diarrhœa and digestive disturbances are very prevalent from June to August. This helps to increase the loss of weight amongst the men affected.

In addition to these possible predisposing causes of beri-beri there are other conditions which also may be considered as more specially predisposing at this season —

(*a*) Overcrowding and defective ventilation of bungalows. Some of the bungalows are overhung by the ground, which interferes with ventilation and renders them very damp in the rainy season. (This has now been remedied.)

(*b*) Excessive physical exercise which has a very debilitating effect particularly if the men are suffering from loss of weight or diarrhœa.

With regard to the four fresh admissions in 1914 it is noted that all lost weight rapidly in the initial stages of the disease and three suffered from diarrhœa which in the case of at least two was of the nature of hill diarrhœa. Three of the cases came from one company whose bungalows were situated at the lowest part of the cantonment about 400 feet below the parade ground and which were unhygienic, owing to being overhung by the ground. The company to which these three men belonged after finishing a course of physical training went straight on to a six weeks' course of company training.

The conclusions reached by the officer specially deputed to see that the recommendations of the Commission were carried out are :—

(1) That the improvement in the incidence of beri-beri in 1914 has been attained in the first and foremost place by the improvement in the dietary, but also in no small degree by the attention paid to general health, hygienic surroundings and physical exercise.

(2) That climate, climatic diseases (diarrhœa) and physical exercise, which is not regulated to meet the conditions obtaining at Lebong, are important factors in predisposing to beri-beri.

The regiment which had been affected by this disease left Lebong on 26th October 1914 leaving only one case of this disease in hospital and he was discharged shortly after.

At Meerut 22 cases were received as transfers from the H. T. "Rewa". These men belonged to the Welsh Regiment which had recently arrived from Egypt. Six of them required readmission two months later. All eventually made a satisfactory recovery. Of the six cases at Dum Dum one ended fatally. All four admissions at Chakrata were from the Welsh Regiment.

Dysentery.

16. There were 373 admissions with 10 deaths from dysentery as compared with 382 admissions and 9 deaths in 1913, giving ratios of 6·2 admissions, ·17 deaths as against 5·4 and ·13, respectively.

The cases were distributed all over the country. The greatest number of admissions were returned from Secunderabad 88, Dinapore 24, Mhow 22, Bangalore 19, Bombay 18, Meerut and Aden 16 each.

In Secunderabad all the cases were amœbic in type. The stools of all gave a negative result on examination for pathogenic amœbæ on two successive occasions before they were discharged from hospital. Emetine treatment was continued after discharge from hospital.

In Mhow, with the exception of two cases, all were considered to be amœbic as they reacted readily to emetine hydro chloride, although the *Entamœba histolytica* was not demonstrated in every case. In the two cases referred to the exhibition of emetine did not produce any beneficial effects. One of them was cured in three days by a daily rectal injection of 30 gr. of albargin to a pint of water, the other case was treated and cured with cyllin douches.

The cases at Dinapore rapidly recovered under treatment with emetine, of which one grain given hypodermically morning and evening was found to be most useful. The *Entamœba histolytica* was demonstrated in each case.

Liver Abscess.

17. There were 29 admissions with 9 deaths for this disease as against 36 admissions and 14 deaths in 1913. These cases occurred at Karachi 3, Lucknow, Peshawar, Barian, Quetta, Poona and Meerut 2 each and one case occurred in each of 13 other stations and one on the line of march.

Pneumonia.

18. Pneumonia contributed 171 admissions and 17 deaths as compared with 227 admissions and 16 deaths in the previous year, giving ratios of 2·8 admissions and ·28 deaths against 3·2 and ·23, respectively. The following stations yielded the largest number of cases, Meerut 14, Fyzabad 13, Lucknow 12, Bangalore 10 and Bareilly 9.

Tubercle of Lung.

19. Fifty-two admissions and 10 deaths were recorded under this head as compared with 56 admissions and 11 deaths in 1913. The ratios of admissions and deaths per 1,000 are, respectively, ·9 and ·17 in 1914 and ·8 and ·16 in 1913. These cases occurred in 34 stations of which 5 were at Kasauli, 4 each at Nasirabad and Belgaum, and 3 each at Nowshera, Madras, Meiktila and Rangoon.

Heat-Stroke and Sun-Stroke.

20. There were 58 cases of heat-stroke with 16 deaths and 23 cases of sun-stroke with 6 deaths in the period under report, as contrasted with 35 admissions and 7 deaths for heat-stroke and 15 admissions and 2 deaths for sun-stroke in 1913. The ratios of admissions and deaths per 1,000 for heat-stroke are, respectively, 1·0 and ·26 in 1914 against ·5 and ·10 in 1913. For sun-stroke the ratios are admissions ·4 and deaths ·10 per 1,000 of strength in 1914 against ·2 and ·03 in 1913. The following stations returned the highest number of cases of heat-stroke, Lucknow 6 with one death (out of hospital), Multan 5 with one death, Fyzabad and Ferozepore 4 each, Peshawar 4 with one death and Nowshera 4 with 2 deaths.

All the six cases in Lucknow occurred between the 14th and 28th June. In five of these, the patients' temperature reached between 109 and 110 F. and the temperature in the 6th case reached 107 F. Meteorological conditions were very favourable to the occurrence of heat-stroke during this period.

Of the 4 cases at Ferozepore 3 occurred on the 26th June and one on the 1st July. Two of the former had suffered from malaria in January, but on admission the

blood was free from malaria parasites. All three cases were comatose when admitted to hospital. They were moderate drinkers. The patient admitted on 1st July was a total abstainer. He retained consciousness throughout the attack.

Cases of sun-stroke occurred at Ferozepore, Lucknow, Fyzabad, Quetta, Jubbulpore, Saugor, Port Blair and Aden.

Poisons.

21. Poisoning was responsible for 77 admissions and 6 deaths as contrasted with 17 admissions and 5 deaths in 1913. The ratios of admissions and deaths are, respectively, 1·3 and ·10 for 1914 and ·2 and ·07 for 1913.

The admissions were due to the following causes :—

Food poisoning—

(*a*) Tinned fish 11 cases.
(*b*) Beef 51 cases.
(*c*) Eggs 1 case.

Choloroform vapour, chloral, poisonous fungi, iodine, opium, lead poisoning and venom of stinging fish, one each; ptomain poisoning 5; venom of stinging insects 2. Of the fatal cases two were from choloroform vapour, one from cyanide of potassium and one each from opium, oxalic acid, and poisonous fungi.

Venereal Diseases.

22. The incidence of venereal diseases in the various divisions and Aden brigade for the past 5 years is given in the following two tables :—

ALL VENEREAL DISEASES.

Ratios per 1,000 of strength.

Divisions.	1913.		1914.	
	Admission.	Ratio.	Admission.	Ratio.
1st (Peshawar)	97	30·1	73	21·4
2nd (Rawalpindi)	211	30·4	229	37·9
3rd (Lahore)	424	47·7	310	43·3
4th (Quetta)	196	37·2	203	43·1
5th (Mhow)	394	48·7	390	58·6
6th (Poona)	433	65·6	449	74·7
7th (Meerut)	378	43·4	365	51·3
8th (Lucknow)	648	73·5	490	65·7
9th (Secunderabad)	500	62·7	395	59·1
Burma	324	105·1	295	103·7
Aden Brigade	42	38·7	74	66·7
Troops marching	70	33·7	72	51·4

ALL VENEREAL DISEASES.

Ratios per 1,000 of strength.

Divisions.	1910.	1911.	1912.	1913.	1914.
Peshawar	38·5	36·0	51·6	30·1	21·4
Rawalpindi	34·2	33·9	34·2	30·4	37·9
Lahore	53·5	44·0	53·0	47·7	43·3
Quetta	41·8	50·0	39·1	37·2	43·1
Mhow	57·1	45·2	48·5	48·7	58·6
Poona	74·5	72·4	64·1	65·6	74·7
Meerut	63·0	49·2	48·1	43·4	51·3
Lucknow	70·3	63·7	72·7	73·5	65·7
Secunderabad	77·9	70·9	74·7	62·7	59·1
Burma	74·4	82·9	84·0	105·1	103·7
Aden	27·9	44·6	49·8	38·7	66·7
For whole of British troops	58·9	53·1	55·5	52·5	55·2

There were 3,345 admissions from all forms of venereal diseases as compared with 3,717 in 1913, giving admission ratios per 1,000 of strength for 1914 of 55·2, and 52·7 for 1913.

The admissions for all forms of venereal diseases per 1,000 of strength during the past 2 years are tabulated below :—

Admissions per 1,000 of strength.

Year.	Syphilis.	Gonorrhœa.	Soft chancre.	All forms of venereal diseases.
1913	10·1	33·6	8·8	52·7
1914	10·4	34·6	10·2	55·2

The following 15 garrisons with a strength of not less than 200 men furnished the highest number of admissions for all forms of venereal diseases during the year:—

Stations.	Average strength.	Admissions.	Ratio per 1,000.
Lahore	932	63	67·6
Nasirabad	713	97	136·0
Rangoon	1,029	119	115·6
Bombay	1,242	139	111·9
Calcutta	1,118	119	106·4
Muttra	382	40	104·7
Barrackpore	313	32	102·2
Shwebo	278	28	100·7
Madras	779	70	89·9
Kirkee	895	37	81·6
Karachi	1,162	82	70·6
Maymyo	653	49	75·0
Rawalpindi	2,502	115	46·0
Cawnpore	842	62	73·6
Poona	1,565	115	73·5

The incidence of venereal disease during the last 5 years according to the arms of the service is shown in the following table.

Years.	Venereal diseases admission ratio per 1,000.		
	Cavalry.	Artillery.	Infantry.
1910	48·2	58·7	64·3
1911	48·9	53·8	57·3
1912	56·1	52·4	60·7
1913	38·1	46·2	59·1
1914	45·8	48·8	61·6

Syphilis.

There were four deaths from syphilis returned during the year as against nine in 1913, equivalent to death ratios per 1,000 of ·07 and ·13, respectively. One case died on the troopship "Rohilla" a few hours after embarkation at Karachi as an invalid for England. Soon after being placed on board he was seized with epileptiform convulsions which ended in death. No post-mortem examination was made. This case had no treatment by salvarsan. The second case was a man who was placed on the syphilis

register on the 6th June 1914. He had two injections of neo-salvarsan, the latter one being given on the 27th June 1914. He was admitted into hospital on the 29th June 1914 suffering from headache and a temperature of 101·4; no malarial parasites were found in the blood. Next day he became semi-comatose and paralysed on the left side of the face and right side of the body. His urine was free from albumen. He died in this condition on the same day—the 30th June 1914. On post mortem examination the left lateral ventricle of the brain was found to be congested and contained an excess of fluid. The third case was a man who had been placed on the syphilis register on the 21st August 1913. He was suffering from necrosis of the bones of the nose and on account of pain and the unsatisfactory condition of the parts which were infected with maggots, it was decided to remove some bone by operation. This was done on the 6th July 1914. Ten minutes after chloroform had been stopped the patient vomited a little blood, his breathing became laboured and cyanosis rapidly followed, death resulting. A post mortem examination was made and revealed œdema of the glottis. Numerous maggots were found in his pharynx, larynx and trachea. The fourth case was a man who contracted a primary sore in 1911 and had received 30 injections of mercurial cream. He was attending fortnightly for inspection previous to having his last course of injections. One morning he complained of weakness and cramps in his legs, his gait was spastic with dragging of the right foot. Next day he passed fæces unconsciously. Paralysis of the left side of the face, followed by paralysis of the right side of the body, developed. He gradually became worse and died 18 days after admission to hospital. Post mortem finding—large patches of softening of the left parietal and frontal convolutions of the brain, with much congestion of the vessels of the parietal convolutions.

Invaliding.

23. The total number of men invalided during the year was 364 as against 539 in 1913, giving ratios of 6·0 and 7·5 per 1,000 of strength, respectively.

The following table shows the numbers invalided for syphilis and gonorrhœa during the last 10 years :—

Table showing the number of cases invalided to England for the more important diseases during the year 1905-14 with the actual totals.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
Syphilis	75	120	76	59	26	18	10	9	13	7
Malaria	126	136	274	62	76	5	7	3	5	5
Valvular disease of heart and disordered action of heart ...	171	222	177	96	71	90	57	61	54	55
Debility	151	255	177	70	20	14	5	13	9	9
Tubercle of lung	116	91	106	72	65	71	55	47	49	27
Dysentery	37	59	49	31	16	9	9	9	7	3
Insanity	65	64	69	53	50	37	40	28	44	34
Local injuries	51	66	62	80	35	35	39	42	35	25
Rheumatic fever (including gout, osteo-arthritis, etc.) ...	48	40	30	27	7	4	12	14	17	5

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
Enteric fever	52	115	86	21	9	4	3	6*	†2	...
Diseases of nervous system other than epilepsy and mental ...	43	59	57	44	25	29	23	36	37	14
Perforation of membrana tympani	36	51	51	24	23	11	12	15	25	10
Diseases of the respiratory system	24	39	50	30	12	16	15	9	9	4
Epilepsy	38	42	33	36	27	25	30	24	26	20
Abscess of liver	49	67	39	31	17	14	8	5	5	7
Hepatitis including cirrhosis	14	36	21	23	4	9	4	5	5	6
Diseases of the eye other than amblyopia and errors of refraction.	29	29	29	20	16	14	12	16	20	5
Diseases of the digestive system other than hepatitis, abscess of liver, cirrhosis of liver, hernia, and caries of teeth.	51	56	41	24	11	11	14	9	11	7
Bilharzia hæmatobia	23	10	4	2	3	1	1	1	...	...
Diseases of the ear other than perforation of the membrana tympani.	28	38	54	44	26	36	50	29	49	50
Diseases of the circulatory system other than valvular disease of heart and disordered action of heart and varix.	23	32	20	18	2	15	10	4	6	9
Hernia	19	15	9	10	3	2	3	1	3	1
Myopia, ametropia, hypermetropia, astigmatism, amblyopia and amaurosis.	19	23	41	20	10	19	13	6	15	5
Gonorrhœa	8	11	21	15	8	7	4	2	9	12
Varix	5	13	9	6	2	1	5	...	...	...
Caries of teeth	14	38	31	9	3	3	6	..	1	1
Beri-beri	25	60	8	5	3	2	1	...	...	...
Anæmia	8	5	7	5	1	...	1	1	1	1
All causes ...	1,506	1,991	1,766	1,074	648	562	512	474	530	364

* Includes 5 from paratyphoid A.
† Both cases are of paratyphoid A.

Years.	INVALIDS SENT HOME.			
	Syphilis.		Gonorrhœa.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1905	75	1·06	8	·11
1906	120	1·71	11	·16
1907	76	1·10	21	·30
1908	59	·86	15	·22
1909	26	·36	8	·11
1910	18	·25	7	·10
1911	10	·14	4	·06
1912	9	·13	2	·03
1913	13	·18	9	·13
1914	7	·12	12	·20

The average number of men annually sent home as invalids for venereal diseases during the years 1910-1914 was 18 compared with an average of 84 for each of the previous 5 years (1905-1909). There has, therefore, been a saving to India on this account, of about 66 soldiers a year.

Officers.

24. The average strength of officers with British units during the year was 2,087 as compared with 2,398 in 1913. Their general health was fairly satisfactory. There were 1,120 admissions for all causes and 8 deaths as against 1,309 and 5 deaths in 1913, giving admission rates of 536·7 and 545·9 and death rates of 3·83 and 2·09, respectively. The chief diseases and the number of admissions from them were:—malaria 122, sandfly fever 70, inflammation connective tissue 60, pyrexia of uncertain origin 49, diarrhœa 40, dengue 23, gastritis 23, enteritis 20, colitis 31, dysentery 16, appendicitis 18, inflammation and congestion of liver 34, jaundice 27, tonsillitis 37, bronchitis 19, boils 21, abrasions and contusions 56, wounds 29, sprains and strains 43, fracture 31, dislocation 8, concussion of brain 13. There were 12 cases of enteric and 3 of paratyphoid fever A, 2 of small-pox, 5 of pneumonia, 7 of pleurisy, and 4 of tubercle of the lung. The causes of deaths were enteric fever three, small-pox, malaria, appendicitis, acute nephritis and wounds one each, respectively.

The table below contrasts the health of officers with that of non-commissioned officers and men for the last 5 years:—

Year.	RATIO PER 1,000 OF STRENGTH.					
	Admissions.		Invalids sent home.		Deaths in the Command.	
	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.
1910	572·9	576·5	18·60	7·75	7·19	4·66
1911	582·1	524·7	15·78	7·07	8·10	4·89
1912	597·9	547·9	16·24	6·68	4·39	4·62
1913	545·9	580·5	14·18	7·49	2·09	3·26
1914	536·7	614·1	16·77	6·01	3·83	4·32

The following table gives the incidence of "enterica" among the four groups of officers, non-commissioned officers and men, women and children in the year, and shows the ratios per 1,000 of strength of admissions and deaths from enteric fever, including paratyphoid fevers A and B.

Officers.		Non-commissioned Officers and men.		Women.		Children.	
Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
7·2	1·48	2·9	·21	4·0	...	2·3	·15

Seven officers underwent anti-rabic treatment. Thirty-five officers were invalided in the period under report, as compared with 34 in 1913. The causes of

invaliding were:—paratyphoid fever, malaria, boils, tubercle of lungs, debility, neuritis, and gastritis two each, pyrexia of uncertain origin, rheumatic fever, tubercle of stomach, gonorrhœa, alcoholism, myelitis, mania, conjunctivitis, inflammation middle ear, thrombosis of veins, varix, dilatation of stomach, appendicitis, inflammation of liver, granular kidney, calculus in kidney, calculus in bladder, contusion, fracture, concussion of brain, one each.

Women.

25. The average number of women during 1914 was 3,772 as against 4,123 in the previous year. Their health was satisfactory. There were 1,819 admissions as contrasted with 2,172 in 1913 or a decrease of 353. The ratio of admissions per 1,000 of strength in 1914 was 482·2 while that of 1913 was 526·8. The diseases which caused the highest number of admissions were:—debility 610, malaria 125, abortion 90, indigestion 62, diarrhœa 42, bronchitis 36, constipation 32, endometritis 26. There were 15 cases of enteric fever, 15 of small-pox, 6 of pneumonia, 20 of dysentery.

The following table gives the admission and death rates for the last 5 years:—

Years.	Ratio per 1,000 of strength.	
	Admissions.	Deaths.
1910	504·7	6·28
1911	495·8	7·39
1912	510 5	9·16
1913	526·8	6·31
1914	482·2	6·36

There were 24 deaths as compared with 26 in the pervious year, giving death rates of 6·36 and 6·31, respectively. The deaths were due to the following causes:—small-pox 3, pneumonia, dysentery and malaria 2 each, cholera, inflammation of connective tissue, quinsy, anæmia, asthma, appendicitis, diabetes mellitus, myoma, valvular disease of heart, cirrhosis of liver, bronchitis, mechancial obstacle to the expulsion of the fœtus, rupture of uterus, convulsions, sudden death after delivery, poisoning by oxalic acid, one each. Five European soldiers' wives underwent anti-rabic treatment. Forty-six women were invalided during the period under report, as against 61 in 1913. The causes of invaliding were:—debility 13, malaria 5, anæmia and valvular disease of heart 3 each, myoma, endometritis 2 each, neurasthenia 4, enteric fever, gastritis, ulcer of uterus, carcinoma, chorea, cholorosis, ulcerative keratitis, iritis, asthma, metritis, retroflexion of the uterus, eczema, suppuration of the Fallopian tube and osteoma, one each.

The following table shows the comparative incidence among women and men in respect of the four chief groups of disease :—

Year.	Admission ratio per 1,000 of strength.							
	Enteric fever including Paratyphoid		Dysentery.		Malarial fever.		Pyrexia of uncertain origin.	
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.
1910 ...	4·6	6·5	7·7	5·3	132·0	34·8	37·7	15·0
1911 ...	3·8	6·4	7·7	7·1	90·2	26·1	26·4	8·0
1912 ...	2·6	7·0	5·2	5·8	82·4	22·4	21·2	10·4
1913 ...	2·3	3·9	5·4	3·2	125·5	36·1	15·6	6·1
1914 ...	2·9	4·0	6·2	5·3	162·8	33·1	10·7	2·4

Children.

26. The average strength of European soldiers' children during 1914 was 6,465 as compared with 7,006 in the previous year. There were 2,474 admissions compared with 2,555 in 1913. The admission rates per 1,000 of strength was 382·7 and 364·7, respectively. The diseases which were responsible for the greatest number of admissions were measles 256, bronchitis 281, diarrhœa 244, malaria 221, debility 179, enteritis 118, tonsillitis 84, conjunctivitis 80, chicken-pox 50, whooping cough 43. Among the other causes were :—dysentery 30, broncho-pneumonia 23, pyrexia of uncertain origin 25, pneumonia 17, infantile convulsions 19, ringworm 14, diphtheria 20, enteric fever 15, mumps 9.

The chief features in connection with the diseases of children are indicated in the following table :—

Year.	Admission ratio per 1,000 of strength.				
	Small-pox.	Measles.	Enteric fever.	Dysentery.	Respiratory diseases.
1910	...	12·1	3·3	6·1	41·2
1911	·1	66·6	4·3	5·7	31·9
1912	2·1	19·2	2·0	3·1	49·5
1913	·6	27·7	3·7	2·3	52·7
1914	·6	39·6	2·3	4·6	48·6

There were 150 deaths as against 140 in the previous year, representing mortality ratios of 23·20 and 19·98. The causes of deaths were enteritis 37, diarrhœa 16, infantile convulsions 12, premature birth 11, broncho-pneumonia 8, debility, cerebral meningitis 6 each, diphtheria and disorders of dentition 5 each, syncope, measles, small-pox, dysentery, malaria, tubercle of meninges and pneumonia 3 each; quinsy, bronchitis, atelactasis and colitis 2 each, and one each from other diseases. There were 9 children subjected to anti-rabic treatment. Seven children were invalided. The causes of invaliding were :—malaria 5, *Tænia solium* and anæmia one each.

The following table shows the marked diminution in the mortality rates per mille of soldiers' children that has been evidenced during the last half century.

Year.	Under 6 months.	Between 6 & 12 months	From 1 to 5 years.
1863	351·4	234·6	115·3
1867	349·8	235·3	114·9
1870	303·1	222·2	109·7
1873	330·7	298·6	104·8
1880	290·8	210·3	75·2
1885	237·1	175·2	34·1
1890	236·7	156·8	35·5
1894	250·6	142·6	31·4
1900	213·7	115·6	34·8
1906	190·6	87·9	27·5
1910	135·7	63·9	11·7
1912	142·4	72·8	20·4
1913	96·7	39·5	11·1
1914	121·4	42·8	12·6

SECTION II.

INDIAN ARMY.

(*From the Director, Medical Services in India.*)

India.

27. The average strength of Indian troops, including those on duty in China and other stations outside India, was 125,074 as compared with 131,512 in 1913. During the period the health of the troops was satisfactory.

The following table gives a comparison between the ratios of sickness, mortality and invaliding for the years 1914, 1913 and the quinquennial period, 1908-1912:—

Troops.	ALL CAUSES—RATIO PER MILLE.		
	1908—1912.	1913.	1914.
Admissions	578·3	531·7	566·5
Constantly sick	20·9	21·4	20·9
Deaths	5·35	4·01	4·17
Invalids	5·31	5·32	7·36

Admissions.

28. There were 70,858 admissions from all causes as compared with 69,928 in 1913, giving ratios of 566·5 and 531·7 per 1,000 of strength, respectively.

Deaths from all causes.

29. There were 521 deaths, as against 528 in 1913, representing death rates of 4·17 and 4·01 per 1,000 of strength, respectively.

The table below shows the death rates per 1,000 among Indian troops since 1880 compared with those of British troops in India during the same period :—

Years.	Indian troops.		British troops.
	Mortality excluding absent deaths based on strength present.	Mortality including absent deaths based on enrolled strength	Death rate per 1,000.
1880	39·22	41·12	24·85
1881	19·24	22·62	16·86
1882	12·24	14·76	12·07
1883	11·76	14·31	10·88
1884	10·50	12·22	12·56
1885	13·67	16·09	14·55
1886	13·27	19·46	15·18
1887	11·68	18·17	14·20
1888	12·84	16·14	14·84
1889	12·94	16·19	16·60
1890	15·91	18·64	13·84
1891	15·44	19·34	15·89
1892	14·97	18·67	17·07
1893	10·29	12·81	12·61
1894	10·76	13·59	16·07
1895	11·60	15·71	15·26
1896	10·20	12·57	14·84
1897	13·12	14·90	22·93
1898	11·07	13·33	20·05
1899	10·70	14·50	12·75
1900	14·04	18·57	14·62
1901	10·68	13·89	12·38
1902	11·16	15·01	14·68
1903	10·04	16·62	13·05
1904	8·46	12·08	10·83
1905	8·09	9·50	10·05
1906	6·57	8·58	10·43
1907	6·27	8·51	8·18
1908	7·41	8·49	9·78
1909	5·62	6·42	6·25

Years.	Indian troops.		British troops.
	Mortality excluding absent deaths based on strength present.	Mortality including absent deaths based on enrolled strength.	Death rate per 1,000.
1910	4·89	7·12	4·66
1911	4·48	6·78	4·89
1912	4·42	5·66	4·62
1913	4·01	4·55	3·26
1914	4·17	3·73	4·32

The principal causes of sickness were:—malaria 14,114 admissions, pyrexia of uncertain origin 4,436, diseases of the respiratory system 3,647, diarrhœa 1,951, venereal diseases 1,945, dysentery 1,781, sandfly fever 1,483, and anæmia and debility 1,435. The main causes of deaths were:—pneumonia 136, enteric fever 41, cholera 33, malaria and tubercle of lungs 29 each. Pneumonia which is invariably the chief cause of mortality, accounted for a quarter of the total deaths, while enteric fever comes next in order of severity: hepatic affections and venereal diseases were less prevalent amongst Indian than amongst European troops, although the former showed much greater proneness to pneumonia, tubercle of the lungs, respiratory diseases and dysentery.

The statistics of Indian Troops located in stations outside India are given in Table XVI.* The average strength of troops serving in China was 4,324, their admission rate was 430·2 and the death rate 2·54 per 1,000 of strength. It will thus be seen that on the whole there was much less sickness in the China stations than in India generally. Malaria, respiratory diseases, anæmia and debility, pyrexia of uncertain origin, dysentery and diarrhœa were the chief causes of sickness. There were 1,860 admissions with 11 deaths, including two from anæmia and debility, two from pneumonia, one from plague and one from tubercle of lungs.

In the stations of the Aden Brigade (Aden Khormaksar and Perim), the average strength was 981, the admission and death rates were 764·5 and 2·04, respectively. The chief causes of sickness were sandfly fever, dysentery, diarrhœa and malaria. There were only two deaths which are recorded under "all other causes."

The following table supplements the information given in Table XVI*:—

—	Average strength.	Admission rate.	Death rate.
Aden Brigade	981	764·5	2·04
Persian Gulf	703	1,290·2	5·69
Colombo and Singapore	1,645	568·4	2·43
Tein-tsin and Hong Kong ...	4,324	430 2	2·54

*Standard Table of the Sanitary Commissioner's Annual Report.

The average strength of the stations on the Persian Gulf was 703, and the admission and death rates were, respectively, 1,290·2 and 5·69. The prevailing diseases were malaria, diarrhœa, dysentery, respiratory diseases, sandfly fever, and pyrexia of uncertain origin. There were four deaths included in "all other causes."

Northern and Southern Armies Divisions.

30. There was more sickness in the Northern than in the Southern Army, the admission rate of the former being 641·3 as compared with 567·5 in the latter. The death rate of the Northern Army was 4·50 and of the Southern Army 4·57 per 1,000 of strength. The highest number of admissions was in the Kohat and Derajat Brigades, 1st (Peshawar) Division and 8th (Lucknow) Division. The main cause of mortality was pneumonia. The lowest death rate was recorded in the Aden Brigade, 8th (Lucknow) and 3rd (Lahore) Divisions.

Stations, Regiments.

31. There were 36 stations in India with an average strength of over 1,000, and among these the admission rates per 1,000 of strength were very high in Alipore, Dera Ismail Khan, Kohat, Peshawar, Bannu and Rangoon and the death rates were high in Multan, Dehra Dun, Lahore, Aurangabad, Sialkot and Peshawar. The main causes of the high admission rates were malaria, pyrexia of uncertain origin, diarrhœa and pneumonia. The chief cause of the high death rate in the first five stations was pneumonia.

The following regiments showed the greatest prevalence of disease during the year and the admission and death rates are noted against each in the table given below :—

Unit.	Station.	Admission rate.	Death rate.
38th Central India Horse ...	Goona ...	330·0	17·63
91st Punjabis ...	Mandalay ...	679·0	13·31
97th Deccan Infantry ...	Jubbulpore, Dera Ismail Khan, Tank.	768·9	12·84
Depôt 15th Sikhs ...	Loralai, Multan ...	859·5	12·22
83rd Wallajahabad Light Infantry.	Secunderabad ...	592·4	12·05
2/1st Gurkha Rifles ...	Kila Drosh ...	1,073·1	12·00

During the year 920 men were invalided from the service as compared with 699 in 1913. The principal causes of invaliding were tubercle of the lungs, anæmia and debility, venereal diseases, epilepsy, valvular disease of heart and rheumatic fever.

Cholera.

32. There were 71 admissions with 33 deaths as against 34 and 20, respectively, in 1913. With one exception all the cases occurred during the second half of the year, and of the total number 48 were reported in August and 12

in September. There were 49 cases in the Northern and 20 in the Southern Army. The disease was sporadic but widespread ; the highest number of cases in any one station was 17, in Kohat. In the cases where a source could be ascertained, infection was traced to neighbouring towns and villages or a polluted water. The fast of Ramzan is also mentioned as a predisposing cause.

Small-pox.

33. There were 32 cases of small-pox with one death as contrasted with 75 cases and one death in 1913. In no unit did the disease appear in epidemic form, the largest number in any one station being 4. The 32 cases were spread over 18 stations.

Enteric fever.

34. It may be remarked that the separation of the enterica group into enteric and paratyphoid fevers is not carried out in Indian troops, as practically all cases are diagnosed as enteric. Facilities do not exist for accurate and scientific diagnosis of these cases, except in Divisional and Brigade Head Quarters stations. Moreover in small outposts in medical charge of sub-assistant surgeons absolute correctness cannot be expected. Most of these cases are diagnosed from Widal reactions or the clinical history only.

There were 202 admissions and 41 deaths as compared with 207 and 30 in 1913. Compared with European troops the ratio per 1,000 of strength for admission was 1·6 Indian as against 2·9 European troops, and for deaths ·33 as against ·17. The cases were scattered over 60 stations, the highest number of admissions being returned from Kila Drosh 23 admissions and 8 deaths, Dehra Dun 21 admissions and 1 death, Jhelum 12 admissions and 2 deaths, Fort Dufferin 9 and 8, Bannu 9 and 1, Poona 7 and 2, Sialkot 6 and 2, Quetta 6 and 1, and Meerut 6 admissions. The following units suffered most. There were 26 cases with 8 deaths in 2-1st Gurkha Rifles. Of these 22 occurred in Kila Drosh and 3 in Madaglast Camp and one in Dharmsala Cantonment. The disease broke out in epidemic form at Kila Drosh. The source of the infection could not be traced, but all possible carriers were segregated and their fæces and urine sent to the Divisional Laboratory for bacteriological examination. Every examination was repeated six times and no "carrier" was identified. Blood cultures and serum of all cases were sent to the Divisional Laboratory, Peshawar. No anti-typhoid inoculations were performed during the year, as the majority of the men were inoculated in August 1912.

Nine admissions with 8 deaths were returned by the 91st Punjabis. An epidemic of fever occurred in this unit in September and October while it was encamped at Mingun. The first case was admitted 3 days after the arrival of a detachment in camp. It was not subjected to bacteriological investigation, as there were no facilities for this purpose in the camp. The chart pointed to a mild variety of the typhoid group of fevers. The total duration of the fever was 19 days. This was the beginning of an outbreak affecting every company in the regiment, which subsequently went to Camp Mingun, and involving a total of 163 cases of fever which though mild apparently belonged to the enterica group.

These fevers commenced with severe headache. No rigor was present, but merely a sensation of chill, pain in the eyes, occasionally sub-conjunctivial hæmorrhage, pains in the back, limbs and joints, vomiting, diarrhœa, abdominal pain, coryza, congestion of the fauces, dry cough, occasional epistaxis. No rash was

observed. In some cases enlarged painful lymphatic glands affecting every region of the body were noticed. These glands did not suppurate but subsided with the defervescence of the fevers. Juice obtained by puncture of these glands on bacteriological examination proved sterile. Hæmoptysis, blood in the motions, bronchitic rales in the chest, diarrhœa and sometimes constipation were present in various cases. Nervous symptoms, *i.e.*, delirium, carphology, muscular twitchings, incontinence of urine and fæces were present in the fatal cases. The earliest fatal result occurred on the 8th day of fever. Five deaths occurred between the 13th and 16th day of fever. In one case death occurred on the 21st day and in another on the 27th day. Relapses characterised by rise of temperature, hæmorrhage from the bowels, congestion of the lungs and liver and cholecystitis occurred in a small percentage of cases.

Although bacteriologically no definite evidence of typhoid infection could be obtained, yet a certain percentage were undoubtedly typhoid fevers, clinically. It was therefore deemed advisable to consider them all as cases of typhoid. Eight deaths occurred during the epidemic.

The cases in this outbreak can be classified broadly into three classes :—

A. Those lasting from 1 to 5 days with an evening rise of temperature up to 100 F. or 101 F. and touching normal in the mornings; without relapses or complications. These cases, although examination of blood under the microscope gave no positive results, were possibly modified cases of malaria. But for purposes of strict nomenclature they have been put under pyrexia of uncertain origin. No deaths occurred in this class and they form less than 20 per cent. of the total number.

B. Cases lasting from 10 to 12 days with a remittent temperature of 103 or 103·5 F. in the evenings and 101 F. in the mornings. The fever came down by lysis. Quinine was of no benefit in these cases, and direct blood cultures proved sterile. These formed about 40 per cent. of the total number, and deaths were rare.

C. Cases of remittent fever of longer duration lasting from 2 to 4 weeks or more. Temperature came down by lysis. Bacteriological examination of specimens, *i.e.*, direct blood culture and examination of fæces and urine gave no information as to the nature of the infection. It was in this class that the majority of deaths occurred. These were possibly cases of enteric fever, although laboratory tests were negative.

Anti-enteric inoculation.—This preventive measure continues to make fair progress among Indian troops. In some regiments in which enteric threatened to spread, practically all the men of the battalion were inoculated. The exact figures as to the number of men inoculated against enteric fever during the year are not available, owing to withdrawal of regiments for field service.

Malaria.

35. There were 14,114 admissions and 29 deaths as contrasted with 13,199 cases and 29 deaths in 1913. This furnishes an admission rate of 112·8 per 1,000 of strength and a death rate of ·23, as compared with 100·4 and ·22 in 1913. The increase was due to the increased incidence of the disease in the Northern Army. The highest number of admissions was reported from Kohat 916 with 1 death, Quetta 872 admissions, Bannu 768, Dera Ismail Khan 646,

Hong Kong 553, Abbottabad 544 with 2 deaths, Muscat 501, Delhi 478 with 2 deaths, Peshawar 365 with 4 deaths, Jhelum 363, Myitkyina 350 with 3 deaths, Tank 282, Dehra Dun 276 with 2 deaths, Aurangabad 191 and Manipur 182.

The undermentioned units reported the greatest number of admissions:—The 102nd Grenadiers at Muscat suffered more than any other unit in 1914. From this regiment 537 cases were admitted. The country is very dry with an annual rainfall of about 4 inches, which falls in the cold weather, between November and March. In spite of this there is a comparatively large amount of water in Bait-ul-Falaj valley, which forms an area into which rainfall from surrounding hills drains. After rain water also collects in pools in the hills. These pools do not dry up for two or three months. *Anopheles culicifacies* has been found breeding in places where water stagnates. Quinine was issued prophylactically in ten grain doses thrice weekly but this does not appear to have done much good. An experiment of giving ten grains per diem was tried for a time, but with no better result. One of the characteristics of the disease at this place is its great tendency to relapse in spite of treatment. The method of treatment was to give fifteen grains thrice daily for ten days to a fortnight, then ten grains thrice daily for one month. After that ten grains twice daily were given for a month. In spite of this, relapses and enlarged spleens were common. Several cases of relapses occurred in men while they were taking thirty grains of quinine per diem. Another notable feature is the length of time required for a man to regain his fitness after an attack of malaria. The parasites are both benign and malignant tertian. Most of the cases were diagnosed by blood examination. One of the peculiarities of the attacks is the great tendency to marked bilious vomiting which was found to be most efficiently treated with twenty-grain doses of powdered ipecacuanha. The drug appeared to improve the patient's condition so much that his stomach would then tolerate quinine and the fever and headache disappeared.

The 18th Infantry at Dera Ismail Khan suffered severely from malaria; there were 393 admissions. This great incidence is ascribed to the comparatively heavy rainfall during the hot weather. Of these cases 203 were benign and 119 malignant tertian and 71 were cases of malarial cachexia. The maximum incidence occurred in October. Quinine was issued prophylactically till the end of December. A large number of relapses occurred, but most of the cases were mild and reacted well to quinine.

There were 387 admissions in the 2-10th Gurkha Rifles at Takdah. The disease is stated to have been imported into the station by men returning from furlough and outpost duties. The actual number of men who contracted the disease locally was 73. The highest incidence occurred in June, July, August and September. The prophylactic use of quinine appeared to be beneficial.

There were 352 admissions in the 64th Pioneers at Myitkyina, in spite of the fact that the men had been taking a prophylactic dose of fifteen grains of quinine on two consecutive days in each week.

The 30th Punjabis at Delhi recorded 296 cases, the incidence of the disease having been highest in the months of August, September, October and November. Malarial infection was widespread and post malarial anæmia of a profound and stubborn character rendered the regiment unfit during these months. The men were taken out in camp away from the infected locality, and treated persistently with tonics. Their health had greatly improved by the end of the year.

The 54th Sikhs at Kohat suffered severely from malaria, the total number of admissions being 257. Parasites were found in the blood of 147 of these cases, 42

being benign tertian, 3 quartan and 102 malignant tertian. The highest incidence occurred in September and October. Anti-malarial measures were carried out and every endeavour made to abolish breeding places for mosquitos. Prophylactic quinine was issued to all ranks.

In the 53rd Sikhs at Kohat, malaria appeared in epidemic form, the total number of admissions being 250; of these 108 were benign and 140 malignant tertian, one quartan and one chronic malaria. The blood of all these cases was examined microscopically: no patient suffering from malignant tertian malaria was discharged until his peripheral blood was free from crescents. One case of malignant tertian ended fatally—cerebral type. Quinine in ten-grain doses was issued prophylactically twice weekly.

There were 250 admissions amongst the 2-5th Gurkha Rifles at Abbottabad. Blood examination was made of all cases. There were 50 cases of malignant tertian and 23 were chronic cases with enlarged spleens. Prophylactic quinine was issued in ten-grain doses on two consecutive days each week and convalescent cases were placed on quinine for four months after discharge from hospital.

There were 313 admissions in the 37th Dogras at Jhelum. The heavy incidence was due to infection of the wing at Dera Ismail Khan from whence it returned very heavily infected with the malignant tertian type of the disease. Many of the cases proved to be of a most resistent type with a tendency to indefinitely protracted fever, and relapses were common. The parasite found in the peripheral blood of 84 cases was of the malignant tertian type.

The 55th Coke's Rifles at Kohat reported 236 cases of which 207 were benign, 10 malignant tertian and 19 chronic malaria. Prophylactic quinine in ten-grain doses was issued twice weekly to all ranks from August to December, when the incidence of the disease was higher than during the previous year.

There were 214 admissions in the 1-7th Gurkha Rifles at Quetta, 212 in the 97th Infantry at Dera Ismail Khan and 206 in the 45th Sikhs at Dera Ismail Khan. In the last named regiment the highest number of admissions occurred in November, and the prevalence of malaria is stated to be due to the lowered vitality of the men, the result of excessive work, and absence of good food while employed on outposts.

The 74th Punjabis at Hong Kong reported 199 cases. This large incidence was due to infection acquired in the outposts occupied after mobilization, which were situated in highly malarious districts of the colony. Prophylactic issue of quinine in ten-grain doses was carried out on two consecutive days weekly. Larger doses, fifteen and twenty grains, were tried without appreciable benefit, and had to be discontinued owing to the resulting cinchonism.

The 123rd Outram's Rifles at Manipur returned 221 cases. Nearly all the cases occurred among men who had returned from furlough, or in men who had had several attacks in Bhamo where the regiment was stationed before coming to Manipur.

There were 196 admissions in the 33rd Punjabis at Bannu, and 175 cases in the 25th Punjabis at Hong Kong. In practically all cases the blood was examined but the proportion of positive results was disappointingly small. This was probably due to the issue of prophylactic quinine.

The 2nd Rajputs at Bombay reported 175 cases, the disease being very severe in October. Anopheles mosquitoes were very numerous in the lines on account of

their close proximity to Indian houses in which anopheles breed. Prophylactic quinine was given in ten-grain doses twice a week.

There were 174 admissions in the 52nd Sikhs at Bannu. All malarial cases were submitted to a course of quinine after discharge from hospital. The 81st Pioneers at Belgaum returned 167 cases, all of whom attended hospital daily for four months and received ten grains of quinine combined with sulphate of magnesia.

The difficulties of eradicating malaria in the Indian Army are increased by the leave system in vogue. It frequently happens that a man on the malaria register goes on leave before he has finished his course of treatment; when malaria is endemic in their homes many men return with enlarged spleens. The effects of furlough infections are reflected in the statistics, which invariably show a rise of admissions for malaria corresponding with the period the men come back, the rise continuing for a month or so. This indicates the necessity of all furlough men on rejoining being carefully examined for malaria and all cases found infected being admitted into hospital.

Pyrexia of uncertain origin.

36. There were 4,436 admissions for pyrexia of uncertain origin with 15 deaths. The highest number of admissions occurred in the following stations:—Dera Ismail Khan 425, Rangoon 315, Jhelum 303, Loralai 297, Quetta 280, Lucknow 244, Rawalpindi 238, Jhansi 181, Karachi 165, Fort Dufferin 144, Abbottabad 129 and Dacca 106.

The units with the largest number of admissions were:—The 18th Infantry at Tank had 272, which occurred in September and October. Most of them were very mild, the fever only lasting 2 or 3 days and being unmarked by any special symptoms. The 79th Carnatic Infantry at Rangoon had 190 cases. The disease was prevalent in the regiment two months after its arrival at Rangoon, and also among the newly joined recruits. It was a seven-day type of fever ranging from 101 to 104°F. with frontal headache, backache, pain in the eyes, vomiting, constipation and slow pulse. No malaria parasites were found in the blood of any of these cases. The 127th Baluchis at Karachi had 155 cases. The 16th Cavalry at Lucknow returned 145 cases: the fever lasted usually three days and no malarial or other parasites were found. In the 91st Punjabis at Camp Mingun (Burma) 141 cases were classed under this head. These fevers lasted from 1 to 5 days with an evening rise of temperature up to 100 to 101, becoming normal in the mornings, without relapses or complications. No positive result was obtained by microscopic examination of the blood. There were 138 admissions in the 10th Lancers at Loralai. The fever in these cases were of remittent or intermittent type and generally of short duration, lasting 3 to 4 days. There were 122 admissions in the 27th Punjabis at Dera Ismail Khan. Malaria was excluded in all cases by blood examination. In the 67th Punjabis at Quetta 118 cases occurred. The medical officer says "Many of these cases were returned as pyrexia of uncertain origin from the various outposts where it was impossible for the subordinates to make accurate diagnosis." The 114th Mahrattas at Jhelum recorded 107 admissions.

Sandfly fever.

37. There were 1,483 cases of sandfly fever as against 1,909 in 1913. The disease was spread over 46 stations and the largest number of admissions occurred in the following stations:—Kila Drosh 347, Chitral 151, Nowshera 147, Peshawar 117, Aden 110, Jhansi 56, Rurki 52, and Bannu 48. No cases were reported from Burma

Coast and Bay Islands, Burma Inland, and Assam. The disease is in itself not of great importance but it lowers the resisting power and vitality of the sufferers and thus renders them more liable to other infections.

The units which suffered most were :—The 2-1st Gurkha Rifles at Kila Drosh, Chitral, and Madaglasht admitted 518 cases in all. The medical officer remarks :—"The heavy incidence this year was very striking. The only way to escape an attack is to get well above 7,000 feet above sea level during the epidemic period. The disease commenced at the end of May, continued for two months, and then gradually died out. There were about 10 per cent. readmissions for second attacks." The 109th Infantry at Aden returned 103 admissions. The disease assumed an epidemic form in December. The fever was the three-day type with severe pains in the body and slight conjunctivitis. Sandflies were present in abundance in November and December.

The 116th Mahrattas at Jhansi had 72 admissions. All "fever" cases not showing malaria parasites in the blood or not indicating by clinical signs their malarial origin, were classified as sandfly fever. The duration of the fever was generally from two to five days, while in some cases the period was prolonged up to one week. These latter exhibited signs of coryza with headache, malaise and sore throat. The 82nd Punjabis at Nowshera admitted 44 cases. The highest incidence occurred in September. The 24th Punjabis at Bannu and Nowshera had 46 cases with highest incidence in July and August. The 1st Sappers and Miners at Rurki had 55 admissions, the disease being prevalent at Rurki in October.

Dengue.

38. There were 544 admissions for dengue as compared with 85 last year. Only 91 cases occurred in the Southern Army ; the rest of the cases were recorded in the Northern Army.

In the 114th Mahrattas at Alipore, Jhelum and Bannu 177 cases were recorded. The 16th Rajputs at Calcutta returned 154 cases, the disease prevailing during August, September and October, being at its height in August. The 66th Punjabis at Rangoon had 78 cases. Efforts were made to isolate an organism from the blood of the cases but in vain. From the 86th Carnatic Infantry at St. Thomas Mount 68 cases were admitted, some contracted locally in Madras where there was a mild epidemic among the civil population. The admissions were recorded chiefly in the early part of the year. The cases were not typical and lasted from January till May. The 17th Cavalry at Allahabad furnished 21 cases and the 62nd Punjabis at Cawnpore 16 cases.

Malta fever.

39. There were 32 admissions without any death, as compared with 43 cases and no death last year. The units which had the largest number of admissions were :—The 7th Rajputs at Benares 9 admissions, 47th Sikhs at Fatehgarh 5, 28th Punjabis at Colombo 4, 45th Sikhs at Dera Ismail Khan 3, 53rd Sikhs at Kohat 2, 57th Wilde's Rifles at Ferozepore 2, and one case each occurred in the 98th Infantry at Saugor, 9th Hodson's Horse at Ambala, 21st Mountain Battery at Dehra Dun, 34th Sikh Pioneers at Ambala, 59th Rifles at Jullundur, 54th Sikhs at Kohat and 1-1st Gurkha Rifles at Dharmsala.

Kala-azar.

40. There were 8 cases of this disease with 4 deaths as contrasted with 7 admissions and 6 deaths last year :—all but 3 of the cases occurred in the Gurkha Regiments. The 1-2nd Gurkha Rifles at Dehra Dun had 2 cases with one

death. In one case the spleen was punctured and the blood examined microscopically. Many *Leishmania donovani* bodies were present. The 2-2nd Gurkha Rifles at Dehra Dun had one fatal case as also had the 1-9th Gurkha Rifles at Dehra Dun. The gradual enlargement of the spleen, the typical irregular fever, the darkening of the face and the pronounced anæmia in the latter left no doubt that the case was actually one of kala-azar. The 1-5th Gurkha Rifles at Abbottabad also returned one fatal case. In this case a splenic puncture was made immediately after death and numbers of *Leishmania* were found in the leucocytes. The man had returned from furlough from Nepal immediately before admission to hospital, and no doubt contracted the disease there. Of the remaining three cases one occurred in the 36th Jacob's Horse at Ambala, the second was an Indian driver attached to No. 10 Battery, Royal Field Artillery at Barrackpore, and the third a sepoy in the 11th Rajputs at Dinapore. All these recovered.

Relapsing fever.

41. There were 41 admissions for this disease with one death, as against 29 admissions and 2 deaths last year. There were 15 cases in the 18th Lancers at Meerut. Three cases occurred in the 31st Punjabis at Fort Sandeman and three in the 28th Light Cavalry at Quetta. Two cases each occurred in the 25th Mountain Battery, Nowshera, 89th Punjabis at Dinapore, and the 39th Central India Horse at Agra. There were single cases in 14 different units spread over 13 stations in various geographical groups.

Beri-beri.

42. One of the most characteristic features of the yearly statistics of the Indian Army is the small number of cases of beri-beri. In the year under report only 7 cases and 2 deaths were reported. Three of the cases occurred in the 61st Pioneers at Bangalore. One case each occurred in the 83rd Light Infantry, Secunderabad, 73rd Carnatic Infantry, Trichinopoly, 63rd Light Infantry, Bangalore, and 102nd Grenadiers, Muscat.

Plague.

43. There were 13 admissions on account of plague with 7 deaths, as against 22 admissions and 13 deaths in 1913. In only one unit, the 46th Punjabis at Nowshera, did the disease threaten to become epidemic, four cases having occurred in that regiment, all pneumonic and all fatal. The first case was that of a man who had just returned from leave from an area notified as non-infected. The two men attendant on him in hospital contracted the disease and died. The fourth case was that of a man who had not left the cantonment for three months previously, but he may have come in contact with infected people from other places. In every case plague bacilli were found microscopically in the sputum. Two cases were reported by the 48th Pioneers while at Bombay, one ending fatally. In the 3rd Sappers and Miners there was one admission while the regiment was in Bombay. The 48th Pioneers had their lines adjoining those of the 3rd Sappers and Miners, and as the former had two admissions for plague it was considered advisable to have them removed to a segregation camp, to avoid the risk of the spread of the disease in the two units. Both these battalions underwent preventive inoculation against plague. In six other units there were single admissions.

Scurvy.

44. This disease accounted for 81 admissions with 2 deaths, as compared with 57 admissions and 3 deaths in 1913. The largest number of admissions occurred in Aden 14, Alipore 8,

Goona 5, Nowshera and Perim 4 each, Rangoon, Bareilly and Bannu 3 each. It was generally of a sporadic character. There were 14 cases in 109th Infantry at Aden. This unit was employed on outpost duty where it was difficult to obtain fresh vegetables. Eight cases occurred in the 16th Rajputs at Calcutta.

The 38th Central India Horse at Goona recorded 5 cases. There were 3 admissions in the Indian Coast Artillery, Aden (Steamer Point). The cases were stated to be due to scarcity of fresh vegetables which were not issued on war ration scale at first. Three cases occurred in the 73rd Carnatic Infantry, Trichinopoly, and 3 in the 127th Baluchis at Karachi. Two cases occurred in each of 10 and one in each of 25 units.

Tubercle of the lungs.

45. Tubercle of the lungs accounted for 270 admissions with 29 deaths as compared with 231 and 32 in 1913. This disease continues to be one of the prominent causes of mortality and invaliding in the Indian Army.

The table below shows the ratios per 1,000 of admissions and deaths of Indian troops as a whole, Gurkhas, and Indian troops excluding Gurkhas, for the past 10 years. It will be noticed that Gurkhas show a much greater predisposition to this disease than other Indian troops:—

TUBERCLE OF THE LUNGS. RATIO PER 1,000.

Year.	Army of India.		Gurkhas.		Excluding Gurkhas.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1905	3·1	·50	6·1	1·58	2·7	·37
1906	2·5	·52	5·2	2·41	2·2	·29
1907	2·5	·33	4·8	1·03	2·3	·24
1908	3·0	·42	5·0	1·43	2·7	·28
1909	2·3	·39	4·0	1·33	2·1	·26
1910	2·4	·19	3·6	·50	2·3	·15
1911	2·1	·21	3·6	·70	1·9	·14
1912	2·0	·24	4·1	·84	1·7	·16
1913	1·8	·24	2·7	·94	1·6	·15
1914	2·2	·23	4·5	1·02	·8	·13

The following units show the greatest incidence of the disease:—11 cases in the 37th Dogras at Jhelum, 9 cases with 4 deaths in the 1-2nd Gurkha Rifles, Dehra Dun, 8 cases in the 124th Infantry at Tein-tsin (North China), 7 cases with 2 deaths in the 2-8th Gurkha Rifles at Lansdowne, 7 cases with one death in the 2-9th Gurkha Rifles at Delhi, 6 cases each in the 13th Rajputs, Agra, and 26th Light Cavalry at Bangalore, 5 cases with one death in the 1-5th Gurkha Rifles at Abbottabad, 5 cases in the 129th Baluchis at Karachi, 5 cases with one death in the 2-7th Gurkha Rifles at Quetta, 5 cases in the Corps of Guides, Mardan.

Pneumonia.

46. There were 910 admissions for pneumonia with 136 deaths as against 993 admissions with 133 deaths in 1913—the ratios per 1,000 of strength being 7·3 and 1·09 in 1914 as compared with 7·6 and 1·01 in 1913.

This disease caused 26 per cent. of the deaths that occurred in 1914, and for several years it has been the greatest cause of mortality among Indian troops. The largest number of cases was recorded in the following stations:—Quetta 56 admissions with 13 deaths, Jhelum 45 with 5 deaths, Bannu 44 with 5 deaths, Kohat 36 with 2 deaths, Rawalpindi 32 with 4 deaths, Nowshera 27 with 4 deaths, Abbottabad 26 with one death, Dehra Dun 25 with 3 deaths, Peshawar 24 with 3 deaths, Chaman 21 with no death, Lahore and Delhi 20 with 4 deaths each, Bangalore 18 with 5 deaths, Poona 17 with 2 deaths, Belgaum 16 with 3 deaths, and Dera Ismail Khan 16 with 4 deaths. The units which recorded the highest incidence were:—29 cases with 3 deaths in the 37th Dogras at Jhelum, 19 with one death in the 43rd Erinpura Regiment at Erinpura and Chaman, 16 with one death in the 122nd Infantry at Kohat, 15 with 4 deaths in the 30th Punjabis at Delhi, 15 with 3 deaths in the 28th Light Cavalry at Quetta, 15 with 2 deaths in the Corps of Guides at Mardan, 15 with 3 deaths in the 12th Pioneers at Quetta and 14 with one death in the 52nd Sikhs at Bannu. There appears to be no doubt that malaria infected men are particularly liable to pneumonia.

Dysentery.

47. There were 1,781 admissions with 10 deaths from dysentery as contrasted with 1,578 and 12 deaths in 1913. The highest number of admissions occurred in the following stations:—Bannu 90 admissions, Dacca 84, Aden 77, Poona 64, Dera Ismail Khan 61 with one death, Rawalpindi 57 with one death, Alipore and Santa Cruz 55 each, Lahore and Jhansi 48 each, Secunderabad 45 and Bolarum 44.

The units chiefly affected were:—The 95th Russell's Infantry at Santa Cruz, among whom 89 cases occurred; the prevalence of the disease in this station was attributed to the defective water supply, mention of which was made in the report for 1913. The 109th Infantry at Aden had 79 cases. The disease was severe among the civil population and spread to the regiment living close to the bazaar. It was chiefly amœbic in type. Owing to an exceptionally wet season flies were numerous. The 22nd Punjabis at Hyderabad (Sind) returned 74 cases. The 18th Infantry at Tank reported 61 cases with one death. The 130th Baluchis at Karachi returned 42 cases with 1 death. The 45th Sikhs at Dera Ismail Khan contributed 42 cases most of which were amœbic; probably some were malarial in origin, as they rapidly responded to quinine. The 11th Rajputs at Dacca had 39 cases with one death. The 40th Pathans at Alipore accounted for 35 cases, most of which were recurrent attacks. They were all treated with emetine with good results. The 6th Jat Light Infantry at Jhansi had 30 cases. The medical officer states:—At the end of December 1913, men of the 6th Jat Light Infantry suddenly started reporting themselves ill with dysentery and diarrhœa. The first man to report was admitted into hospital on the 25th December. He suffered from pain and tenesmus, frequent calls to stools and had blood and mucus in the motions. His symptoms were characteristic of dysentery and on the rise of his temperature he received an injection of emetine hydrochloride. After the injection of two doses of emetine his symptoms disappeared three days after admission. On the 28th, another man reported ill but no serious notice was taken of this occurrence. On the 29th and 30th December, however, the matter assumed a rather serious aspect when about 67 persons came to hospital, all complaining of diarrhœa, and a large number of these laying special stress on the presence of blood and mucus in their motions, frequency of calls to stools, pain and tenesmus. Out of these 67 men, 39 had to be admitted into the hospital on the 30th December. The epidemic lasted about twelve days. The last man to be admitted into the hospital was on the 7th January 1914. The total number of men reporting ill during

these twelve days was 107, out of which 61 were admitted into hospital. Other cases were of mild character and fit to resume work in a couple of days.

Certain cases, in addition to having mucus and blood in their motions, had a rise of temperature up to 102° or so. The large majority of patients, however, did not look ill. They complained of pain and mucus and blood in their stools, but had no fever and were able to walk about. About 30 men had diarrhœaic stools with a small amount of mucus but no blood, and were able to resume their work in a few days.

Of the 61 admitted into the hospital nearly all had their fæces examined for causal organisms. Fresh motions were examined microscopically and *Entamœba histolytica* was demonstrated in stools from most of the cases. All cases which showed the presence of amœbæ in their stools were put on emetine treatment, and responded immediately to the drug. There was not a single death. Their period of stay in the hospital varied from 4 to 9 days. The regiment had recently returned from manœuvres and men believed that they brought the infection from the camp. All the men blamed the water they got to drink at a village called Torprani about two miles south of Masipet railway station (His Highness the Nizam's Railway). It is a village of fair size, and like all villages in the Deccan it has little regard for sanitary principles. Filthy drains, heaps of litter, and pig-styes are noticeable at every door. The water supply was liable to pollution of all kinds.

Colitis.

48. There has been an increase in the admissions for colitis; the number of admissions being 831 with 2 deaths as against 607 with no death in 1913.

There were 87 cases with one death in the 64th Pioneers at Myitkyina. The disease was chiefly present during the hot weather and the rains. Other reports showed 47 admissions in the 66th Punjabis at Jhelum, 47 cases in the 109th Infantry at Aden, 34 cases in the 17th Infantry at Mauritius, 25 cases in the 13th Lancers at Risalpur, 24 cases each in the 14th Lancers at Risalpur and 2-8th Gurkha Rifles at Lansdowne, 19 cases in the 112th Infantry at Dargai and Chakdara, 17 cases in the 90th Punjabis at Nasirabad and 16 in the 1-1st Gurkha Rifles at Dharmsala. In the case of the 13th Lancers at Risalpur the medical officer reports that saline treatment with saturated solution of magnesium sulphate was found more efficacious than emetine.

Venereal Diseases.

49. There were 1,945 admissions with 4 deaths as compared with 1,656 admissions and 4 deaths in 1913. The ratios per 1,000 of strength were 15·6 for admissions and ·03 for deaths as against 12·6 and ·03 for 1913.

The following stations returned the highest number of admissions :—Secunderabad 89 admissions, Poona 84, Belgaum 83, Abbottabad 76 with one death, Bangalore 75, Jhelum 60, Dehra Dun 59 with one death, Ahmednagar 53, Quetta 52, Rawalpindi 50, Hong Kong (China) 43, Lucknow 42, Peshawar and Alipore 36 each, Shillong and Bannu 35 each, Nowshera 34, Bombay 31, Karachi and Rangoon 30 each. The units which suffered most were :—94th Russell's Infantry at Nowshera 39 cases, 114th Mahrattas at Jhelum 38, 127th Infantry at Karachi 37, 1-8th Gurkha Rifles at Shillong 35, 73rd Carnatic Infantry at Trichinopoly 31, 117th Mahrattas at Poona and 120th Infantry at Belgaum 30 each, 2-5th Gurkha Rifles at Abbottabad 29, 83rd and 88th Infantries at Secunderabad, 110th Mahratta Light Infantry at Belgaum and 124th Baluchistan Infantry, Tein-tsin (North China) 28 each. Of

the four deaths, all of which occurred from syphilis, one was due to myelitis and one to syphilitic nephritis. The symptoms and history of the third death pointed to a syphilitic affection of the Gasserian ganglion or the higher centres of the fifth cranial nerve. In the fourth fatal case the patient was admitted suffering from ptosis (left lid) and before death he developed a spastic condition of both upper and lower extremities and difficulty of speech.

Suicides.

50. There were 10 cases of suicide as contrasted with 17 in 1913. One was by drowning and nine from gunshot wounds.

Guinea-worm.

51. Guinea-worm was responsible for 256 admissions as compared with 241 in 1913. The units in which the largest number of admissions occurred were:—22 cases in the 117th Mahrattas at Poona, 19 in the 103rd Mahrattas at Belgaum, 12 in the 114th Mahrattas at Jhelum, 11 in the 109th Infantry at Aden, 10 in the 110th Mahrattas at Belgaum, 9 in the 105th Mahrattas at Poona, 8 each in the 17th Infantry at Mauritius and 128th Pioneers at Sitapur, and 7 each in the 101st Grenadiers at Bangalore and 40th Pathans at Hong Kong.

Ankylostomiasis.

52. There were 61 admissions for ankylostomiasis. The highest number of cases occurred in the following units:—15 cases in the 1-9th and 12 in the 1-2nd Gurkha Rifles at Dehra Dun, 11 in the 2-9th Gurkha Rifles at Delhi, 7 in the 2-2nd Gurkha Rifles at Dehra Dun. The 54th Sikhs at Hangu recorded 6 cases.

Commissioned British Officers.

53. The average annual strength of British commissioned officers with Indian troops during 1914 was 1,791. The total admissions from all causes among them were 631 with 10 deaths as compared with 825 with 6 deaths in 1913. The principal causes of admission were:—Malaria 79, pyrexia of uncertain origin 51, synovitis 19, sandfly fever 18, and dysentery 15. The deaths resulted from chronic nephritis and gunshot wound, two each, rheumatic fever, appendicitis, duodenal ulcer, concussion of brain, cholera and alcoholism, one each. There were 8 admissions for enteric fever among British officers attached to Indian troops: all recovered. The admission and death rates from enteric fever as compared with British troops and their officers are:—British officers attached to Indian troops admission rate 4·50, death rate *nil*. British officers with British troops admission rate 7·2, death rate 1·44.

SECTION III.

GENERAL POPULATION.

54. The year 1914 opened badly: there had been insufficiency of rainfall during the latter months of 1913 and famine conditions were established in the west and south-west of the United Provinces: scarcity was also reported from parts of Rajputana, Central India, Bombay and the Central Provinces. In January, February and April there was widespread rainfall in Northern India. March, however, was unusually dry. In May the weather was very unsettled. Taking India as a whole the rainfall was 11 per cent. in excess of the normal during these first five months. Certain parts of India, notably the United Provinces, received more than double their customary amount. The temperatures over Northern India were abnormally low.

Agricultural conditions.

The monsoon rains were abundant and well distributed. By the end of October relief operations had entirely ceased.

October to December were characterised by extreme weakness of the retreating monsoon, early and heavy winter rains, and unusually fine weather during the last three weeks of the year.

Of the chief crops wheat did fairly well: the outturn was, however, considerably below that of 1913 and 2 per cent. below the quinquennial average. The Punjab which contains over a third of the wheat growing area of India did well. The yield of rice was also 2 per cent. below that of 1913. The yield of sugar-cane was lower than in 1913, but 4·6 per cent. above the quinquennial average. The prospects at the end of the year were extraordinarily good: as a matter of fact the outturn of the 1914-15 wheat crop has established a record.

55. The accompanying table shows the total number of births and deaths registered in each administration, and in British India as a whole, in 1914.

Births and deaths. General.

Province.	Births.			Total deaths.			Ratio of deaths per 1,000 of population.			Mean death rate during previous five years.		
	Total number.	Ratio per 1,000 of population.	Mean ratio during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.
Delhi	19,387	48·86	...	9,501	5,578	15,079	42·14	32·52	37·08	...	...	...
Bengal	1,535,281	33·86	35·02	71,875	1,359,414	1,431,289	24·72	32·04	31·57	24·12	29·10	28·78
Bihar and Orissa	1,461,879	42·3	40·9	34,511	942,332	976,843	28·8	28·3	28·3	29·1	32·3	32·7
Assam	199,343	32·94	32·01	2,726	146,518	149,244	22·19	24·71	24·66	30·66	27·21	26·99
United Provinces of Agra and Oudh	2,104,554	44·93	42·24	126,060	1,441,206	1,567,266	40·77	32·91	33·46	41·58	36·81	37·14
Punjab	895,006	46·3	42·8	63,269	554,804	618,073	36·94	31·48	31·96	33·44	30·79	31·12
North-West Frontier Province.	66,701	32·7	35·3	5,539	47,021	52,560	28·96	25·42	25·75	24·05	24·28	24·25
Central Provinces and Berar ...	714,917	51·37	50·80	48,758	461,894	510,652	39·26	36·44	36·69	41·26	36·64	37·05
Madras Presidency	1,340,168	33·5	32·0	176,797	851,470	998,267	30·4	24·2	25·0	27·7	22·5	23·1
Coorg	4,590	26·23	26·88	540	5,418	5,958	54·10	32·84	34·05	54·14	31·22	32·52
Bombay Presidency... ...	733,076	37·43	35·77	107,413	470,091	577,504	33·78	28·65	29·48	36·36	28·20	29·51
Burma { Lower	221,460	34·69	33·00	26,919	119,840	146,759	33·55	21·47	22·99	36·81	23·95	25·56
Burma { Upper	127,423	36·69	35·13	12,207	78,862	91,069	41·26	24·82	26·22	43·99	28·07	29·57
Ajmer-Merwara	23,515	46·90	42·42	Not available.		15,208	Not available.		30·33	Not available.		40·48
British India	9,447,300	39·61	38·63	656,115	6,484,448	7,155,771	33·18	29·71	30·00	33·36	30·65	30·89

The birth rate for British India was 39·61 per mille as compared with 39·31 in 1913 and 38·61 the mean for the previous quinquennium. As usual the Central Provinces and Berar records the highest birth rate 51·37 (49·26 in 1913) and of the major provinces, the North-West Frontier Province records the lowest 32·7. Delhi, Ajmer-Merwara, the Punjab, the United Provinces and Bihar and Orissa all had birth rates ranging between 40 and 50 per mille: birth rates in all the remaining administrations were between 32 and 38 with the solitary exception of the small province of Coorg where the rate was only 26·23. Coorg was the only province which had a death rate in excess of the birth rate. The excess of births over deaths amounted to 16 per mille in Ajmer-Merwara, 15 in the Central Provinces and the Punjab, 14 in Bihar and Orissa, 11 in the United Provinces, Delhi and Burma, 9 in Bombay, 8 in Madras and Assam, 7 in the North-West Frontier Province and 2 in Bengal.

Assam, the United Provinces, the North-West Frontier Province and Burma had lower birth rates than in 1913: all the other administrations reported enhanced rates.

The death rate for British India rose from 28·72 in 1913 to 30·89 per mille. All the provinces of India except the United Provinces, Assam, Burma, Bihar and Orissa and Delhi shared in this increased mortality rate. Assam's death rate was ·3 per mille, Delhi's 2·01 per mille, the United Provinces' 1·38 per mille and Burma's ·36 per mille lower than the corresponding figures for the previous year.

Excluding the small and in many ways exceptional province of Delhi the Central Provinces returned the highest death rate *viz.*, 36·69 per mille. Lower Burma had the lowest death rate 22·99 per mille, followed by Bihar and Orissa 24·66, and Madras 25.

Chief diseases.

56. Deaths reported under the six main headings in the various administrations of India during 1914 are tabulated below:—

Province.	Cholera.		Small-pox.		Plague.		Fevers.		Dysentery and Diarrhœa.		Respiratory diseases.		All other causes.	
	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
Delhi	12	·03	43	·10	13	·03	8,469	21·38	320	·80	4,268	10·75	1,954	4·92
Bengal	89,224	1·95	9,935	·21	554	·01	1,061,041	23·40	30,167	·66	12,389	·27	227,979	5·03
Bihar and Orissa ...	32,115	·9	5,778	·2	64,334	1·8	699,913	17·7	26,355	·7	6,208	·1	232,141	6·7
Assam	9,270	1·53	2,575	·42	1	·0001	83,199	13·75	13,519	2·23	4,013	·66	36,667	6·06
United Provinces of Agra and Oudh.	32,498	·69	17,954	·38	103,954	2·22	1,050,505	22·43	18,436	·39	23,518	·50	320,400	6·84
Punjab	6,656	·34	2,900	·15	64,010	3·31	345,501	17·87	13,272	·69	46,785	2·42	138,049	7·19
North-West Frontier Province.	2,300	1·13	331	·16	166	·08	38,750	18·99	441	·22	1,598	·78	8,974	4·40
Central Provinces and Berar.	20,345	1·46	4,581	·33	896	·06	234,528	16·86	48,045	3·45	44,575	3·20	157,682	11·33
Madras Presidency ...	68,449	1·7	27,889	·7	5,102	·2	307,620	7·7	75,990	1·9	43,499	1·1	469,718	11·7
Coorg	...	...	114	·65	10	·06	4,803	27·44	177	1·01	54	·31	801	4·58
Bombay Presidency ...	17,779	·91	4,209	·21	20,060	1·02	259,164	13·23	42,961	2·19	65,941	3·37	167,390	8·55
Burma {Lower ...	2,042	·32	241	·04	5,172	·81	48,654	7·62	5,929	·93	5,376	·84	79,345	12·43
Burma {Upper ...	31	·01	17	...	2,316	·67	27,473	7·91	2,182	·63	2,593	·75	56,457	16·26
Ajmer-Merwara ...	9	·02	23	·05	...	...	12,726	25·38	431	·86	332	·66	1,687	3·36
British India {1914 ...	280,730	1·18	76,590	·32	266,588	1·12	4,092,345	17·16	278,225	1·17	261,149	1·09	1,900,144	7·97
British India {1913 ...	294,815	1·24	98,155	·41	198,456	·83	3,983,112	16·71	246,578	1·03	237,229	1·00	1,786,673	7·50

Cholera.

57. Cholera was somewhat less prevalent than in the preceding year. In only five of the thirteen administrations did it cause a mortality exceeding one per mille. The disease was more prevalent in Bengal than elsewhere and here the death rate approximated 2 per mille.

Assam came second with a rate of 1·53. Only 31 deaths from cholera were reported from Upper Burma during the year and Coorg was free from the disease. The United Provinces had a cholera death rate little more than half that of 1913, whereas the cholera mortality in Madras was nearly double that of the preceding year. In India as a whole there was less cholera in 1914 than in any year in the last decade excepting 1909 when the death rate was 1·05.

Small-pox.

58. Small-pox had a lower mortality, ·32 per mille, than in 1913 when the rate was ·41. The latter figure closely approximates the mean of the decade 1905-14. Amongst the major provinces the disease was most prevalent in Madras, least prevalent in Burma. Madras had nearly twice as many deaths ascribed to small-pox in 1914 as in the previous year. On the other hand the Punjab returned only 2,900 deaths as against 38,687 in 1913. The question of vaccination is dealt with in section V of this report.

Plague.

59. Plague was more prevalent than in 1913; the plague death rates for the two years were 1·12 and ·83 per mille, respectively. The Punjab, the United Provinces, Bihar and Orissa and Bombay were the only provinces in which the plague death rate exceeded one per mille. As a matter of fact these are the only four provinces in India in which plague is usually a factor of any great importance in the mortality returns. Though India has not been afflicted recently with such violent outbursts of plague as characterised 1905 and 1907, its recurrence year after year in the four provinces mentioned above is a matter of some concern. Taking India as a whole plague caused fewer deaths in 1914 than did cholera. The geographical distribution of plague in 1914 presented nothing abnormal; this distribution was shown in the map that accompanied this report* for the year 1912. Large areas on the east cost of the Peninsula, Eastern Bengal and Assam still remain free from the disease. The chart* facing this page shows graphically the course that plague has run since its introduction into India in 1896 up to the end of the year under report. The constant seasonal prevalence of the disease is well shown. It must be remembered, however, that in certain parts of India, notably the districts in the Bombay Deccan and adjacent districts of the Madras Presidency and Mysore, the onset of plague epidemics synchronises more or less closely with the advent of the monsoon. In such areas epidemics attain their maximum intensity in September or October and not in March or April as is the rule in practically all the plague stricken areas of northern India.

"Fevers."

60. Of the 7,155,771 deaths from all causes registered in British India no fewer than 4,092,345 (57 per cent.) were ascribed to "fevers". As to what proportion of these "fever" deaths can rightly be ascribed to malaria we have at present no means of ascertaining. The ratio of deaths ascribed to fevers to total deaths is as high as 74 per cent. in Bengal and as low as 30 per cent. in Madras and 32 per cent. in Burma. As usual amongst the major provinces the fever death rate was highest in Bengal and lowest in Madras.

Respiratory diseases.

61. "Respiratory diseases" is another heterogeneous group including a multitude of diverse complaints. Deaths ascribed to this "cause" amounted to 10·75 per mille in Delhi, 3·37 in Bombay and 3·20 in the Central Provinces. On the other hand the rate was as low as 0·1 per mille in Bihar and Orissa. With the present far from satisfactory methods of recording vital statistics in India, but little would be gained by attempts to explain the extreme variations in the rates returned from the various provinces.

* In report of Sanitary Commissioner with the Government of India, for 1914.

62. The death rate from dysentery and diarrhœa was 1·17 per mille as compared with 1·03 in 1913. The deaths returned under this head remain relatively constant round about 1 per mille of population. During the last decade 1·32 (1906) has been the highest and 0·96 (1909) the lowest rate recorded. The Central Provinces, Assam and Bombay were the three provinces in which diseases of this nature were most prevalent in 1914.

Dysentery and diarrhœa.

63. The birth rate in the province in 1914 was 48·86 per thousand against 44·84 in 1913, and was the second highest rate among all provinces in India during the year under report. The death rate declined from 39·99 to 37·98 in 1914: this was the highest rate in any province. The rate for females was 42·23 and for males 34·60. The excess of births over deaths was 10·88 per thousand which is more than double the corresponding figure for the previous year. The infantile mortality rates were 292·0 for males and 281·79 for females, compared with rates of 283·55 and 264·12, respectively, in 1913. The most unhealthy months were May and June and the most healthy December and July.

Delhi.

Of the total death rate of 37·98, "fevers" accounted for 21·33 per thousand and respiratory diseases for 10·75: the corresponding rates for the previous year were 39·99, 26·18 and 9·17, respectively. There was comparative freedom from infectious diseases: plague claimed only 13 victims and cholera 12, against 199 and 37, respectively, in 1913.

The appointment of Health Officer Temporary Capital was abolished and the duties connected with it were transferred to the Health Officer of the Municipality. The measure was consequent on the view that sufficient improvement in the general sanitary condition of the Notified Area had been made to obviate the necessity for a separate appointment.

64. In Bengal in 1914 the rainfall was generally deficient and ceased early. The agricultural outturn was consequently in defect in all but five districts. With the exception of Bakarganj the price of food grains ruled high: this fact was probably responsible in part for the increased death rate. The birth rate was slightly higher in Bengal than in the previous year, 33·86 per mille as compared with 33·86. The rate is, however, appreciably lower than that of the previous quinquennium, 35·02.

Bengal.

The birth rate in rural areas was as usual considerably higher than in towns. Only six towns had a birth rate of over 30 per mille: the highest rate was in Cox's Bazar (Chittagong) 33·34 per mille. Jessore had the lowest rate, 4.71 per mille. The birth rate was below 20 in seventy-three towns and between 20 and 30 in thirty-three. In 76 of the 112 towns the death rate exceeded the birth rate. Fourteen rural areas reported birth rates of over 45 per mille. Asasuni (Khulna) comes first with a rate of 62·53 per mille. The district birth rates varied between 41·04 in Murshidabad and 19·40 in Calcutta.

There was 107 male to every 100 female births.

The provincial death rate was 31·57 in 1914 against 29·38 in 1913 and 28·78 the quinquennial average. The district death rates varied between 61·17 in Murshidabad and 21·56 in Mymensingh. In five districts the rate was over 40 per mille. The average urban death rate was 24·72. The male and female death rates were 31·87 and 31·25, respectively.

December and November were the two months in which the death rate was highest: fewest deaths occurred in July, considerably less than half the number in either of the two cold weather months mentioned above.

The infantile mortality rate per thousand births was for males 227·2 and for females 215·2: both these figures are slightly higher than those for 1913.

Cholera was responsible for 89,224 deaths (1·96 per mille) a figure very closely approximating the mean of the previous quinquennium. All the districts of Bengal suffered, only 18 of the 487 registering circles being free from the disease. Murshidabad was the worst infected district (death rate 4·34 per mille). In Malda there was a very virulent epidemic in November and December which claimed 3,951 victims in two months. Darjeeling and Dinajpur escaped lightly and here the cholera mortality amounted to only 0·09 and 0·36 per mille. March and April were the two months in which cholera mortality was highest. There was a second rise in mortality in November and December which is the normal cholera season in Bengal.

Small-pox caused 9,935 deaths (·21 per mille) a higher figure than that of either of the previous three years but fifty per cent. lower than the preceding quinquennial average. Vaccination is still in a most unsatisfactory state in Eastern-Bengal. Small-pox was very prevalent in Calcutta whence infection spread into surrounding districts. December was the month of highest small-pox mortality and was closely followed by May, April and June. 226,632 fewer vaccinations were reported (see Section V) a decline that is not unconnected with new methods in force of scrutinizing the figures supplied by the vaccination staff. The district small-pox mortality rates varied between 1·45 per mille in Chittagong and ·009 per mille in Khulna. There was proportionally to population over three times as much small-pox reported from towns as from rural areas in 1914.

Plague was responsible for only 554 deaths of which 442 occurred in Calcutta. Practically all the deaths occurred in municipal towns. Plague has never been a very serious menace to Bengal but all the same it is most satisfactory to note the steady decline in the plague mortality figures of this province that the last few years have witnessed.

In 1914, 74 per cent. of all the deaths in Bengal were reported under that comprehensive designation "fevers". The "fever" death rate was 23·40 per mille, a higher figure than that returned for either of the two preceding years and 3 per mille above the mean of the preceding quinquennium. In districts the "fever" death rate varied between 3·15 per mille in Calcutta, and 40·23 per mille in Birbhum. The mortality rate from this cause was 8·22 in towns and 24·44 in rural areas. Recent years have shown a decline in urban "fever" death rates. What percentage of fever deaths can rightly be ascribed to malaria it is impossible to say.

Quinine was distributed gratuitously in the more malarious districts. The sale of quinine in treatment form is also becoming more popular in certain districts. The sale has nearly doubled since the introduction of the present system in August 1913.

There was a decrease in the mortality, ascribed to dysentery and diarrhœa which amounted in 1914 to 0·66 per mille (0·73 in 1913). The mortality was lower in both rural areas and towns. In Bengal the marked reduction in the prevalence of dysentery and diarrhœa that follows the introduction of a filtered water supply

is very evident.

65. The climatic conditions of the City of Calcutta in 1914, were approximately normal, and in marked contrast to the preceding year.

City of Calcutta.

The birth rate was 19·4 per thousand against 20·5 in 1913 and 21·6 in 1912. This steady decline is unsatisfactory, and attributed, in part at least, to defective registration.

The death rate was 28·3 per thousand of the census population, which is lower than the rate of 29·2 in 1913, and of 28·6, the average of the preceding quinquennium. Infectious diseases were responsible for 3,463 deaths against 2,736 in 1913: small-pox was responsible for this increase. The female death rate continues to be much above the rate for males, *viz.*, 38·5 and 23·5 per thousand respectively: both rates are, however, lower than those of the previous year.

The infantile mortality rate of 282·7 per thousand births was higher than in any of the past seven years. In 1912 with 19,426 births the infantile mortality was 259·6; in 1913 with 18,386 births the rate was 274·8; in 1914 with 17,386 births the rate rose to 282·7. It is said that defective registration of births is the real explanation of the apparent rise: this statement is supported by the fact that there were 4,916 infant deaths in 1914 against 5,054 in the previous year. Efforts are being made to improve the registration of births.

The recrudescence of plague was mild and the disease claimed only 442 victims against 852 the year before: cholera was more prevalent and caused 1,983 deaths against 1,764 in 1913: deaths from measles fell to 79 from 386: malaria deaths were also fewer, 1,214 against 1,420: deaths from enteric fever dropped to 253 from 350: dysentery and diarrhœa described as a serious item in the "bill of mortality" also claimed fewer victims *viz.*, 2,296 against 2,636: deaths from tuberculosis fell from 2,196 to 2,137.

66. The number of European and Asiatic seamen inspected on inward bound vessels during 1914, was 7,789 and 26,973 compared with 6,583 and 18,737 in the previous year: on outward bound vessels the numbers were 11,141 and 40,134, respectively, against 13,172 and 45,830.

Port of Calcutta.

The admission rate to hospital for European seamen was 31·47 per thousand, calculated on the number of arrivals, compared with 29·91 in 1913, and the death rate was 12·41 against 5·73 per thousand. Amongst Asiatic seamen the death rate was 7·27 against 6·65 per thousand in 1913. Two cases of cholera, three of small-pox and four of chicken-pox were removed from sea-going vessels; nine cases of measles were reported from sea-going vessels: in all cases necessary precautions were adopted. No case of *jigger* or sleeping sickness was detected on any of the ten vessels from East African ports.

The sanitary condition of the Kidderpore Docks was reported to be most unsatisfactory: the matter is engaging attention.

67. Climatic conditions did not differ very markedly from the normal and there was an average agricultural outturn. The population upon which the ratios referred to below have been estimated was 6,051,507 for the plains districts.

Assam.

In the hills districts the areas in which registration is carried out contain a population of only 192,656 : vital statistics for these hills districts are considered separately.

On the whole 1914 was a particularly healthy year.

The birth rate amounted to 32·94 per mille against 33·06 for 1913 and 32·01 the quinquennial average. The district rates varied between 39·90 in Goalpara and 28·45 in Lakhimpur. The rural birth rate 33·07 was considerably in excess of that of the towns 26·64. In the Guma rural circle the highest birth rate, 76·35 per mille, was recorded.

The recorded death rate was 24·66 per mille to which it fell from 27·66 (1913). The mean of the previous five years was 26·99. The highest district rate was 33·61 in Darrang, the lowest 19·54 in Cachar. The rural death rate 24·71 was higher than that of towns 22·19. December was the month of greatest mortality, March the month of least. The infant mortality amounted to 200·3 per thousand births for males and 177·8 for females.

Considerable defects in the registration of vital statistics were brought to light: it is hoped that the representations made by the local Sanitary Commissioner will result in improvement in this important matter.

In the four hill districts in which registration was possible the birth rate varied between 25·18 and 40·91 per mille and the death rate between 18·34 and 32·84.

The birth and death rates in tea estates were 24·54 and 21·93 per mille, respectively, both rates being appreciably lower than in 1913.

Cholera was less prevalent than in the previous year and yielded a death rate of 1·53 per mille compared with 2·87 the decennial average. Small-pox was responsible for 2,575 deaths (·42 per mille). Considerably more than half the total deaths were ascribed to "fever": the fever death rate being 13·95 per mille.

The mortality caused by kala-azar has shown a steady downward tendency during the last four years. This disease caused 1,298 deaths which is much the lowest figure recorded during the last decade. Nowgong (393) and Darrang (317) were the two worst infected districts contributing between them 54 per cent. of the total deaths. Six travelling dispensaries toured the infected areas with a view to obtaining information as to the distribution and spread of the disease, as well as carrying medical aid to remote villages : they did useful work.

Dysentery and diarrhœa caused fewer deaths than usual. An inquiry was carried out into the prevalence and high death rate of these diseases in tea gardens. The conclusions arrived at indicate that water supplies are rarely to blame ; the universal lack of conservancy and the prevalence of ankylostomes appear to be factors of importance. A large proportion of the population of Assam is infected with *Ankylostomum duodenale* or allied species; at the same time ankylostomiasis, *i.e.*, sufficiently large infections to cause the classical symptoms, appears to be rare. In Sibsagar of 387 ankylostome worms examined 384 were found to be *Necator americanus* and only three *A. duodenale*.

Bihar and Orissa.

68. The rainfall for the year closely approximated the normal. The health conditions showed still further improvement in nearly every district.

The provincial birth rate was 42·3 per mille, a slight increase on the 1913 rate, 42·10 : the mean rate of the previous five years was 40·9. Among districts the

lowest rate 35·3 was recorded in Santhal Parganas and the highest 51·6 in Palamau. The average birth rate of towns was 31·2. There were 104 male to every 100 female births. The excess of registered births over registered deaths amounted to 14 per mille.

The death rate fell from 29·14 in 1913 to 28·3 per mille: both these figures are very appreciably lower than the quinquennial mean 32·2. The district death rates varied between 21·6 in Singhbhum and 36·5 in Saran.

There was but little difference between the urban and rural death rates which work out at 28·8 and 28·3, respectively. The death rate for males was 29·7 and for females 26·9. March was the month of maximum mortality when the deaths were more than 50 per cent. in excess of those that occurred in July the healthiest month. It is noteworthy that in the previous year more deaths occurred in July than in any other month.

The infantile mortality rate for males was 177·7 and for females 164·4 per thousand births: these rates are considerably lower than those returned by any other Administration.

The above figures are evidence of a healthy year: the provincial death rate is the lowest that has been recorded in the Province since 1899, *i.e.*, before the advent of plague in this part of India.

Amongst 18,646 vital occurrences inquired into in 55 municipal towns 8·1 per cent. omitted to register which is evidence of a very unsatisfactory state of affairs. In rural areas only 1 per cent. of omissions was detected (63,784 occurrences reported to have been investigated). Registration of vital occurrences is receiving well merited attention at the hands of the local Government and improvement can be looked for.

Cholera was responsible for a mortality of ·9 per mille, a marked improvement on the rate for 1913, 2·0, (decennial average is 2·8). The Cuttack district suffered most: here the death rate was 3 per mille, 6,486 deaths: three-quarters of these deaths occurred in the last four months of the year a fact attributed to the early cessation of the monsoon rains. Attention is called again in the local sanitary report to the important parts played by pilgrims in the spread of infection though no fresh facts are adduced in support of the contention. This matter is discussed at considerable length in the Bihar and Orissa Pilgrim Committee's report which has recently issued.

Small-pox caused 5,778 deaths, *i.e.*, ·2 per mille which was 50 per cent. lower than the small-pox mortality rate for British India as a whole. The number of vaccinations reported has shown a decline in recent years.

The death rate from "fevers" was 17·7 per mille, *i.e.*, 62 per cent. of the total mortality. The highest district "fever" death rate reported was in Purnea, 26 per mille. The distribution of quinine in the worst malaria stricken districts received attention.

The plague mortality of the Province averaged 1·8 per mille. The epidemic was well above average severity: as usual its maximum intensity was reached in March when over 24,000 of the total 64,000 deaths occurred: the seasonal prevalence of plague in this province is remarkably constant. Plague as usual was practically confined to the west of the province: when it is recalled that at least twelve of the twenty-one districts of Bihar and Orissa never suffer appreciably from plague, situated as they are in the large plague free tract of Eastern India, it will be understood that the death rate cited above gives no indication of the severity of the

outbreak in some of the nine affected districts. Saran (plague death rate 8·9 per mille), Patna (6·7), Shahabad (6·9), Monghyr (2·4) and Gaya (2·3) were the worst sufferers. In no other districts did the mortality exceed the provincial average.

A reference to a map will show that these five districts are in or adjoin that badly plague infected area with the Ballia district of the United Provinces as its centre which was well shown in the plague map that accompanied this report* for 1912. This area presents greater difficulties from the plague standpoint than perhaps any other part of India, for though individual epidemics do not attain the intensity that sometimes characterize outbreaks in the Punjab and the west of the United Provinces, plague infection survives the adverse conditions of the hot weather with much greater facility than in the latter areas. Thus it comes about that this part of India is practically never quite free from infection, and when the favourable climatic conditions that obtain in the cold weather recur numerous foci of infection are always present from which the disease rapidly spreads. Energetic measures in the months of minimum intensity, July to September, would appear to afford the best chance of diminishing the severity of the subsequent outbreak.

Anti-plague inoculation is now more readily resorted to and during the year 24,330 inoculations were performed as against 11,538 in the previous year.

Had it not been for this plague outbreak Bihar and Orissa would have experienced an abnormally healthy year.

The United Provinces of Agra and Oudh.

69. The provincial birth rate in 1914 was 44·93 per mille as compared with 47·67 in 1913 and 42·24 the mean of the previous five years. As pointed out last year the 1913 rate was the highest recorded since 1899. In 1914 only two other major provinces had higher birth rates than the United Provinces, *viz.*, the Punjab and the Central Provinces. The highest district rates were recorded in the Bundelkhand districts of Jhansi 57·22 and Hamirpur 56·45. Dehra Dun again had the lowest birth rate, 25·56: the fluctuating population of this district is considered to be in large measure responsible for this low figure. There were 108 male for every hundred female births, the same figure as for last year. The birth rate in towns averaged 43·55, a figure not much below the provincial rate. The birth rate exceeded the death rate by 11·5 per mille.

The provincial death rate fell from 34·84 in 1913 to 33·46 (mean of previous quinquennium 37·14). Only one of the major provinces, *viz.*, the Central Provinces returned a higher death rate in 1914. The district death rates varied between 54·83 in Bijnor and 23·47 in Gonda. The average death rate of towns was 40·77 and of rural areas 32·91. The death rate for males was 33·35 and for females 33·58. April again was the month in which most deaths occurred and July the month with fewest deaths: in the former the deaths were more than 50 per cent. more numerous than in the latter. The infantile mortality rate for males was 238·15 per thousand births and for females 228·39: these rates are higher than those that pertained in the preceding two years but are about 20 per mille below the previous decennial average. The possibilities of reducing infantile mortality are receiving considerable attention: travelling dispensaries; the training of dhais; the distribution of leaflets and posters dealing with the feeding of children and the prophylaxis and treatment of malaria; and the establishment of co-operative dairies are among the means devoted to this end. The infantile death rate in towns was 290·23 per thousand

* Report of the Sanitary Commissioner with the Government of India.

births as compared with 229·59 in rural areas; both rates being higher than in 1913 (271·19 and 227·12, respectively).

An interesting inquiry was started in Lucknow into the causes of mortality in cases of death attributed to fevers; it was ascertained that only one-tenth of the deaths ascribed to fevers were in reality caused by malaria.

The percentage of omissions discovered in birth and death registrations was 3·35 and 2·35, respectively: 305,143 births and 228,247 deaths were inquired into by local district authorities and deputy sanitary commissioners. Of 812,643 vital occurrences tested by the vaccination staff, the percentage of omissions was only ·31 per cent. in the case of births and ·18 in the case of deaths.

Cholera caused 32,498 deaths corresponding to a death rate of ·69 per mille, as compared with 1·29 in 1913 and 1·36 the quinquennial average. The disease was most prevalent in September and October when only two of the forty-eight districts were free from the disease. The distribution of potassium permanganate to patwaris, with orders for its immediate use in the disinfection of wells on the appearance of cholera, appears to have been successful in checking the disease in rural areas: the scheme promises well. The district cholera death rate was highest in Banda, 2·98 per mille, and lowest in Hardoi where only five deaths occurred. The disease was more prevalent in towns than in rural areas.

Small-pox was responsible for 17,954 deaths(·38 per mille) a figure twice as large as that in 1913 and four times the quinquennial average. The small-pox death rate was as high as 2·40 per mille in the Allahabad district. In four districts there were less than 10 deaths ascribed to this disease. The disease was twice as prevalent in towns as in rural areas.

Plague yielded a death rate of 2·2 per mille against 2·3 in 1913 and 3·2 the average of the previous quinquennium. As usual March was the month of maximum mortality and July that of least. Six districts were practically free from the disease. The small Ballia district still preserves its unenviable reputation of being the worst plague infected district in the province and probably the most persistently infected district in the whole of India. In this connextion reference may be made to the remarks made above on the subject of plague in Bihar and Orissa. In the year under report Ballia's plague death rate was 26·20 per mille (mean of previous quinquennium, 19·25). Only two other districts suffered in any degree comparable to this, *viz.*, the two adjacent districts of Ghazipur (14·96) and Azamgarh (10·51). These three districts whose combined population is about one-fifteenth of the total population of the United Provinces contributed close on half the total number of plague deaths recorded. The plague problem presented by these three districts which are never plague free is one of peculiar difficulty. There was less plague in towns than in rural areas.

To "fevers" 1,050,506 deaths were ascribed, a rate of 22·43 per mille, *i.e.*, roughly two-thirds of the total mortality. With four exceptions this rate is the lowest on record during the last 34 years. More "fever" deaths occurred in May, and fewer in August, than in any other month. Of course it is quite impossible to premise what part malaria played in the production of this mortality. Amongst the preventive malaria measures undertaken in the United Provinces may be mentioned :— an investigation into the influence of rice cultivation on the incidence of malaria in five selected districts; an investigation into the vital statistics of Lucknow City referred to above; lectures and lantern demonstrations and the distribution of pamphlets; extensive anti-malaria schemes in Saharanpur, Nagina and Kosi; quininization of school-children.

Relapsing fever was reported as being the cause of considerable mortality in the Moradabad, Agra and Muttra districts.

Travelling dispensaries continue to do much useful work in the United Provinces.

Punjab.

70. On the whole the year was a healthy one in the Punjab. The price of food grains was not high till the last quarter of the year when there was a sharp rise partly due to increased demand from Europe. The provincial birth rate was 46·3 per mille as compared with 45·4 in 1913 and 42·8 the mean rate of the previous five years. Amongst districts Ferozepur and Amritsar reported the highest rates, 53 per mille, and Simla the lowest, 19·7. The death rate rose from 30·2 per mille in 1913 to 32; the mean of the previous quinquennium works out at 31·1. Gujranwala district returned the highest death rate 46·3 and Simla the lowest, 20·8. The urban death rate, 36·94, was higher than the rural, 31·48. The male rate was 30 and the female 34·3 per mille. The infantile mortality rate was for males 208·98 and for females 211·38 per thousand births; both these figures show a substantial decrease when compared with 1913. The excess of births over deaths amounted to 14·3 per mille. May was the month of maximum mortality when the deaths were 50 per cent. more numerous than in July which was the month with fewest deaths.

Cholera was responsible for 6,656 deaths, ·34 per mille; though this number is in appreciable excess of that reported in 1913, *viz.*, 5,811, the Punjab was still much freer from this disease than the majority of the provinces in India. Amritsar City returned 747 deaths and the Amritsar district 525. This was the worst infected area in the province. August was the month of maximum cholera prevalence in most districts; nearly half the total deaths occurred in this month. The province was practically free from cholera for the first five months of the year. Frequent delays in reporting the first cases of cholera were responsible for much of the difficulties in dealing with the disease.

Small-pox was but little prevalent; its reported death rate was only ·15 per mille (2 per mille in 1913); the lowest rate on record.

Plague was more prevalent than in either of the two previous years: in fact the death roll it was responsible for, 64,010, 3·31 per mille, exceeded the total plague deaths in both the previous years combined. All the same it was a relatively mild plague year: one has only to recall the 666,501 deaths in 1907 the 402,950 deaths in 1904 and 390,233 in 1905 to appreciate the accuracy of this statement. In point of severity, the 1914 outbreak stands eighth on the list of the last twelve epidemics. All the same the recrudescense of plague in 1914 was disappointing. Anti-plague inoculation is becoming more popular as a preventive measure. The attitude of the people towards the special plague staff is appreciative in the face of actual danger of infection but in the non-epidemic season, when preventive measures are likely to be attended with most ultimate benefit, their attitude is, to say the least, apathetic.

As usual more than half the total deaths were attributed to "fevers" which had ascribed to it a death rate of 17·87 per mille (17·15 in 1913 and 16·87 the quinquennial average). Malaria (associated with an increased rainfall) assumed epidemic proportions in the Muzaffargarh district.

A small epidemic of relapsing fever was reported in the Gurgaon district and an outbreak of typhus fever in the Mianwali district.

North-West Frontier Province.

71. A lessened birth rate and an increased death rate characterized the vital statistics of the North-West Frontier Province in 1914 as compared with the previous year.

The birth rate fell from 36·2 to 32·7 per mille. This rate is lower than that recorded in any of the major provinces of India in the year under report, a fact that may be in part due to the relatively backward state of the registration of vital statistics in this province. The district birth rate was lowest in Peshawar, 28·8, and highest in Dera Ismail Khan, 37·3. There were 121 male births recorded for every hundred female, a fact which in itself lays the methods of registration of births in vogue open to the charge of more than ordinary inaccuracy.

The death rate rose from 24·7 to 25·8 per mille in the year under report; only three Indian provinces had a lower rate than this. The district rate was highest in Bannu, 34·3, and lowest in Peshawar, 22. November was the month of highest mortality, April that of lowest. Forty-two per cent. of the total registered deaths occurred amongst children less than five years of age and 24 per cent. during the first year of life.

Cholera was prevalent in the districts of Kohat, Peshawar and Bannu: the provincial cholera death rate amounted to 1·13 per mille. In Kohat cholera was responsible for 1,116 deaths (5·15 per mille).

Plague was responsible for 165 deaths, all in the Peshawar district.

Central Provinces and Berar.

72. The year under report was not as healthy as its predecessor. Rainfall was irregular in its distribution; in some districts it was excessive whereas there was scarcity of water in some of the northern districts. In the Jubbulpore Division there was a marked failure of the crops: elsewhere the harvests were generally fair.

The birth rate rose from 49·26 in 1913 to 51·37 per mille, a very much higher rate than in any other province. The mean rate of the previous five years was 50·80. The district rates varied between 40·39 in Mandla, and 57·15 in Saugor. There were 104 male for every hundred female births.

The death rate rose from 30·28 in 1913 to 36·69 per mille, a figure that is, however, still below the quinquennial average, 37·05. All districts except Damoh had a higher death rate than in 1913, and all reported causes of death except small-pox extorted a greater toll. The highest district rate was in Akola, 44·97, and the lowest in Betul, 28·16. The urban mortality rate, 39·26, was considerably higher than the rural rate, 36·44. September was the month of maximum mortality when the deaths were 90 per cent. more numerous than in February, the month with fewest deaths. The infantile mortality rate for males was 281·89 and for females 245·11 per thousand births; the combined rate, 263·89, is 3 per cent. higher than that reported for 1913.

Cholera caused 20,345 deaths (1·46 per mille). The local sanitary commissioner again calls attention to the important part played by pilgrims in the dissemination of the disease. In no month was the Province free from the disease: September was the month of maximum cholera mortality when 4,472 deaths occurred. Nagpur was the worst infected district (death rate 4·65 per mille): here the disease was most prevalent in March. No district was free from the disease though in ten districts out of the twenty-two the cholera death rate was less than one per mille.

Measles and Chicken-pox were both prevalent, 8,942 deaths having been attributed to these causes, chiefly amongst infants.

Nearly half the total deaths were attributed to "fevers" which were reported to have caused a death rate of 16·86 per mille. Most "fever" deaths occurred in September, October and May. What proportion of these deaths were attributable to malaria it is of course impossible to say. Recent experiments in these provinces have demonstrated the value of village jungle clearing as an anti-malarial measure. In Singanama the spleen rate was thus reduced from 92 to 62 per cent. Special endeavours are to be made to combat malaria through the agency of travelling dispensaries.

Dysentery and diarrhœa were both more prevalent than in 1913 and were reported to have caused 28 per cent. greater mortality. The increased prevalence was probably connected with heavy rainfall in certain districts and scarcity of food in others.

Plague caused 896 deaths, ·06 per mille, of which 409 occurred in the Hoshangabad district. There were 243 deaths from rabies reported.

Madras.

73. The total average rainfall was somewhat in excess of that of 1913 which closely approximated the average. It was, however, unevenly distributed. Thus, compared with 1913, there was an increase of 45 inches in South Canara and a decrease of 20 inches in Ganjam. The harvests on the whole were satisfactory; in spite of this there was no appreciable fall in the price of food grains which remained very much above the average.

The birth rate rose from 32·2 in 1913 to 33·5 per mille; the preceding quinquennial average is 32. This was a lower rate than that returned by any other major province in India. The district rate was highest in Malabar, 40 per mille, and lowest in Ramnad, 23·1. The urban rate 32 was lower than the rural rate 33·7. There were 104 male births for every hundred female.

The provincial death rate rose from 21·4 to 25 (quinquennial average 23·1). Madras thus no longer held pride of place as the administration with the lowest death rate: both Assam and Lower Burma reported lower rates in 1914. The district death rate varied between 47·1 in Madras and 17·2 in Ramnad. The urban death rate was 30·4 whilst the rural rate was only 24·2. December was the month of maximum mortality when the deaths were fifty per cent. more numerous than in April the month with fewest deaths.

The infant mortality rate was for males 206·4 and for females 186·3 per thousand births or combined, 196·5 per mille. Infantile mortality was highest in Madras City, 312·5, a higher rate than any reported during the last quinquennium.

Cholera caused 68,449 deaths (1·7 per mille): the disease was more prevalent in Madras than in any other province excepting Bengal. It was nearly twice as prevalent as in 1913. Twenty-four of the 25 districts were infected, the Nilgiris alone escaping. The Kurnool district suffered most, 5·6 per mille. Only seven districts had a cholera death rate of less than one per mille. August, July and September were the months of maximum cholera incidence.

Small-pox was more prevalent than in any other administration and yielded a death rate of 0·7 per mille. Bellary was the worst affected district and here the high mortality rate of 3·9 was reported. No district was free from the disease though the Nilgiris only reported five deaths therefrom.

Plague caused 5,102 deaths (0·1 per mille). Fourteen districts were completely free from indigenous plague. Of the remainder Bellary as usual suffered most and returned a plague death rate of 1·4 per mille, followed by North Arcot, 0·9, and

Coimbatore, 0·5. These three districts contributed 84 per cent. of the total plague mortality of the Presidency.

Deaths attributed to "fevers" only amounted to 7·7 per mille, *i.e.*, less than a third of the total mortality. No other administration except Burma returned a "fever" death rate sufficiently low as to be in any way comparable to this. The rate is, however, one per mille higher than that returned in 1913. The district fever death rates were as low as 2·3 in North Arcot and as high as 19·0 per mille in Vizagapatam plains. The fever death rate in municipalities was only 5·3 per mille. A large amount of useful malaria research work has been carried out in recent years in the Madras Presidency; this is, for the time being, in abeyance owing to the large demands that the war has made on medical officers in India. The chief anti-malaria measures in force were concerned with quinine administration, stocking of collections of water with larvicidal fish, water tidiness, prohibition of wet cultivation in close proximity to human habitations, and the filling up of useless wells and ponds. Travelling dispensaries are also doing useful work. The prevalence of malaria in Madras City received special attention.

City of Madras.

74. The birth rate in the City of Madras in 1913 was 37·5, a lower rate than in either of the two preceding years: in 1914 the rate fell further, being only 35·1 per thousand of the population: it is the lowest rate recorded in the last 12 years. Of the total births 18·3 per cent., against 18·9 per cent. in 1913, occurred in hospitals. The measures taken to improve the registration of births will, it is hoped, have good effect. The infantile mortality rate was 308·9, which is much higher than the rate of 293·4 in 1913. The death rate of the City rose from 39·9 in 1913 to 46·6 per thousand in 1914. The deaths of females exceeded that of males, the proportion being 96 males to every 100 females. The cholera epidemic of the year was an unusual feature which swelled the number of deaths. The disease caused a death rate of 3·4 per thousand of the population, and there is the suspicion that the increase in mortality under "dysentery" was really due to deaths from cholera being returned as dysentery. The usual causes of high mortality in the city—malaria, dysentery and diarrhœa—showed no marked diminution in intensity, and respiratory diseases increased from 11 to 15 per cent. of the total deaths.

Malaria operations were continued in the City under a special malaria officer.

Port of Madras.

75. During 1914, 188 outgoing vessels were inspected and granted Bills of Health, and 304 vessels from plague infected areas, with 46,406 passengers, of whom 43,056 were landed at Madras, were inspected and granted pratique. One suspected case of plague, one case of measles, one of small-pox, and 4 of chicken-pox with 9 contacts, were sent to the Krishnampet Isolation Hospital during the year, and 5 cases of chicken-pox with 14 contacts to the Fiji Emigration Depôt: all the cases were importations by sea.

First and second class passengers were given notification papers in place of passports—these numbered 1,931.

Coorg.

76. The birth rate in Coorg rose from 25·88 in 1913 to 26·23 in the year under report, the quinquennial mean being 26·58. The death rate rose in 1914 to 34·05 from 33·48 in the previous year, the quinquennial mean being 32·52. The increased mortality is attributed chiefly to the prevalence of malaria, dysentery and diarrhœa.

The highest mortality occurred in June and the lowest in October. The infantile mortality rates showed a rise, from 300·35 to 304·64 for males and from 266·52 to 281·77 for females. Of the 5,938 total deaths from all causes, 4,802 were ascribed to fever against 4,584 in 1913: 114 to small-pox against 41, 10 to plague in each year, and none to cholera against 192.

Bombay.

77. The year was comparatively unhealthy. Very heavy rainfall in July, August and September resulted in the scouring of the land and the contamination of the water supplies with resultant increase in mortality. The price of food grains was generally normal.

The birth rate rose from 34·96 in 1913 to 37·43 per mille in the year under report (quinquennial average 35·77) a considerably higher rate than any recorded in the last decade. The district birth rate varied between 54·58 in West Khandesh and 18·31 in Nawabshah. Registration in this latter district is very defective. The rural birth rate was 43·68 and the urban rate 26·9, a very remarkable difference. One hundred and seven males were born for every hundred females.

The death rate also rose from 26·63 in 1913 to 29·48 per mille, a figure that very closely approximates the preceding quinquennial average, 29·51. Five other administrations recorded a lower rate, and five a higher. The highest district rate was in Nasik, 40·21, and the lowest in Nawabshah, 13·54. The urban rate, 33·76, was in slight excess of the rural rate, 31·82. August was the month of greatest mortality but the number of deaths reported in each month did not show as much variation as in the majority of Indian provinces. The increase on the population of 1911 for the Presidency, excluding Sind and Bombay City, was one per cent.

The infantile mortality rate was for males 201·86 and for females 185·15 per thousand births. The death rate of children under five years was notably high amounting to 95·51 per mille: forty-five per cent. of deaths occurred at this age period.

Cholera was responsible for 17,779 deaths (0·91 per mille) as compared with only 5,134 in 1913. Bombay thus comes sixth on the list of administrations with regard to the severity of cholera in 1914. Sind was free from the disease: in the remainder of the Presidency, Panchmahals was the only district that completely escaped though Ahmedabad, Kanara, Kaira, West Khandesh and Ratnagiri suffered but very lightly. Satara was the worst infected district, its cholera death rate amounting to 3·45 per mille. May, June and July were the months of greatest prevalence and in them 61 per cent. of the total deaths occurred. The history of cholera in Bombay in 1914 emphasizes the danger underlying the movements of the population, *e.g.*, the movements of pilgrims, in the dissemination of the disease.

Small-pox was less prevalent than in any of the five preceding years and was responsible for a death rate of only ·21 per mille; a precisely similar rate to that of Bengal and Bihar and Orissa. The disease was nowhere extremely prevalent. With the exception of Surat which reported 22 deaths the Gujarat registration district was completely free from the disease. Considerably more than three-quarters of the deaths occurred during the first half of the year. In 54 villages in the Southern Registration district which had a combined population of 26,501, of which 80 per cent. were more or less protected by vaccination, twenty per cent. of the unprotected were attacked whereas only four per cent. of the vaccinated suffered from small-pox.

The mortality rate for those attacked was 3 per cent. for the vaccinated and 14 per cent. for the unvaccinated.

The "fever" death rate was 13·23 against 12·58 in 1913 and 12·99 the quinquennial mean. Burma and Madras alone had fever death rates lower than this.

Plague was responsible for 20,060 deaths (1·02 per mille), a lower figure than any reported in the last twelve years. In three districts Belgaum, Kolaba and Dharwar the death rate just exceeded 3 per mille: in only seven other districts did the rate exceed unity. No month was free from the disease: the conditions prevailing in the hot weather months were not so inimical to the disease as experience has taught us to expect.

City of Bombay.

78. The weather conditions of 1914 were more favourable than during the previous year. The outstanding feature was the abnormally heavy rainfall, which was 81·62 inches against the normal of 71·15 inches. The progressive improvement of the health conditions of the City was well maintained during 1914: what the improvement referred to represents, is illustrated by the retrospect of the Executive Health Officer in his administration report. It is claimed that while the population has increased, epidemics have been much less frequent, and marked by a decreasing fatality, reflecting a steady and encouraging improvement; conditions now bid fair to approximate to the conditions of western cities.

The birth rate of the year was 20·09 per thousand against 20·05 in 1913. A statistical phenomenon of the year was the excess of registered births over deaths during two weeks in October, three weeks in November and one week in December. The natural increase is regarded with interest, not only as being of rare occurrence in an oriental city, but also as being without parallel in the sanitary history of Bombay. The infantile mortality rate was 385·1 in 1914 against 381·1 in 1913.

The death rate increased slightly compared with 1913, the rates being 32·52 and 32·47 per thousand, respectively. As usual, diseases of the respiratory system exacted the heaviest toll and caused a death rate of 8·91 per thousand: the other high rates were plague 3·0, fevers 2·93, diarrhœa 2·24: the corresponding rates in 1913 of the foregoing causes of death were 8·78, 2·66, 3·10 and 2·40, respectively. Except for plague no disease occurred in a seriously epidemic form in the City during the year.

Port of Bombay.

79. During 1914, the number of outward bound vessels leaving Bombay was 913, and a total of 255,910 persons, passengers and crew were inspected, compared with 808 vessels and 139,265 persons in the previous year. The bedding, boxes and suspected articles of clothing of 40,663 Asiatic and African members of crews and of 27,098 passengers and pilgrims of lower than 2nd class, were disinfected, and also of 858 crew and 26 passengers of Asiatic sailing craft for ports out of India. The disinfection of the effects of the crews of transports was by special orders not enforced. There were 173 in-coming vessels with crews aggregating 14,337 and passengers 38,223. These were inspected according to standing orders. On 26 vessels there were, or had been on the voyage, cases of infectious disease: three were troopships on which a case of plague and three cases of scarlatina had occurred: the plague case proved fatal at sea.

During the year, 1,336 persons connected with the shiping were admitted to

various hospitals in the City. There were 20 deaths among 625 admissions of Europeans and 95 deaths among 721 admission of Asiatics.

80. With a rainfall somewhat in excess of that of the previous year the price of food grains was lower than in 1913.

Burma.

The birth rate in Lower Burma rose from 31·74 to 34·69 per mille as compared with 33 the mean rate of the previous quinquennium. The district rate varied between 19·41 in Rangoon and 43·39 in Tavoy. The rural rate, 36·27, was markedly in excess of the urban rate, 23·72. There were 107 male births registered for every hundred females.

In Upper Burma the birth rate also showed a considerable increase, being 36·69 per mille against 34·20 in 1913 and 35·13 the mean of the previous five years. The district rate was highest in Shwebo, 43·78, and lowest in Minbu, 27·26. The urban rate was 34·96 and the rural rate 36·85. One hundred and five males were born for every hundred females.

In 1914 Bengal, Madras, Assam and the North-West Frontier Province all had lower birth rates than had Burma.

In Burma the death rate fell from 23·58 in 1913 to 22·99, both figures being considerably lower than the quinquennial mean, 25·56. In Upper Burma a similar decline in the mortality rates was recorded, the rates for 1914, 1913 and the mean of the previous five years being 26·22, 27·60 and 29·59, respectively. The combined Burma rate was 24·13 a lower rate than that reported by any other administration in 1914. The highest district death rates were recorded by Mandalay (40·97) Kyaukse (37.13) both in Upper Burma and Rangoon (33·31) in Lower Burma. The lowest district rates were in Thaton (19·17), Amherst (19·28), Hanthawaddy (19·29) in Lower Burma and Sagaing (19·74) in Upper Burma. The urban rates were in marked excess of the rural being 33·55 and 21·47, respectively, in Lower Burma and 41·26 and 24·82 in Upper Burma. December was the month of maximum mortality in Upper Burma and August in Lower Burma. May was the healthiest month in both areas. Infantile mortality rates were for males 221·05 and for females 192·37 per thousand births in Lower Burma. The corresponding figures for Upper Burma were 244·42 and 219·52.

Cholera was responsible for 2,073 deaths of which only 31 were reported from Upper Burma which was completely free from the disease for eight months of the year. The disease was thus less prevalent in Burma than in any of the other major administrations of British India.

The Akyab district suffered most and was responsible for more than half of the total reported cholera deaths. Akyab had a cholera death rate amounting to 1·97 per mille: in no other district did the rate approach unity.

Plague was the reported cause of 7,488 deaths of which 5,172 were in Lower Burma. Once again the whole of the Arakan division with the Tavoy and Mergui districts in Lower Burma remained free from the disease. Rangoon as usual was much the worst infected district in Lower Burma and here the plague mortality amounted to 5·4 per mille: in no month was Rangoon free from the disease. Amherst was the only other district in Lower Burma in which the plague death exceeded one per mille. In Upper Burma Mandalay was the only district in which the disease was at all severe (death rate 4 per mille). Meiktila and Kyaukse had plague death rates of 1·18 and 1·05, respectively. Pakokku and Minbu were completely plague free and elsewhere the incidence of the disease was insignificant.

The height of the plague epidemic in Burma was in February: the secondary July exacerbation, most evident in Rangoon, was less marked than usual.

The deaths attributed to fevers amounted to 7·62 per mille in Lower Burma and 7.91 in Upper Burma both figures being less than in the previous year. Thus less than a third of the total deaths were assigned to this heterogeneous category, a distinction that Burma shared only with Madras, in the year under report. January, December and July were the months of maximum "fever" mortality. Enteric fever was widely distributed though nowhere was any considerable mortality attributed to it. Yaws was reported as prevalent in four districts; an outbreak of beriberi was recorded in Akyab.

City of Rangoon.

81. The birth rate in Rangoon in 1914 rose to 19·41 from 18·87 per thousand in the previous year. The death rate of 1913, which was 30·37 per thousand, and the lowest on record, increased to 33·31: this increase is to a large extent attributed to the increased mortality from plague. The infantile mortality rate for the year was 294·22, and though higher than the rate of 269·06 in 1913, was below the rate in any of the years 1909 to 1912. A society for the prevention of infantile mortality in Rangoon, to which reference was made in the last report, came into existence in July 1914: the expenditure involved is to be met from public subscriptions and donations, and to assist the society to carry on the work aimed at by the employment of 4 nurse midwives, the municipality has sanctioned a monthly contribution of Rs. 400 from April 1915, and, it is understood, the local Government will make a grant of Rs. 2,500. It is hoped that the work of the society will not only reduce the number of infant deaths, but also have a good effect by the inculcation of the elements of home hygiene into the minds of the poorer classes.

The mortality from plague was 5·41 against 3·05 in 1913. Cholera was credited with 46 cases and 37 deaths, but a large number of these cases were choleraic diarrhœa and not true cholera. Of 75 cases of small pox only 13 proved fatal; the majority of these cases occurred in March.

Port of Rangoon.

82. The number of in-coming vessels in 1914 was 1,068, against 1,227 in 1913, but a larger number arrived in quarantine than in the year before, *viz.*, 42 and 17, respectively. The cases of infectious diseases detected were 51, against 9 in 1913,—cholera (13), small-pox (6) and chicken-pox (27) mainly accounting for the increase. The number of sea-going vessels for ports beyond India inspected was 350 against 419 in 1913, and 106 passengers were detained, against 114, on account of illness. Three river vessels, on two of which there were plague cases, and on the third a death from beri-beri, were disinfected in Rangoon.

Ajmere Merwara.

83. The birth rate in this small province which had fallen from 47·08 in 1912 to 43.19 in 1913, showed a recovery to 46·90 per thousand in 1914: the quinquennial mean was 42·42. The death rate which had dropped from 38·25 in 1912 to 25·85 in 1913, rose to 30·33 per thousand in 1914; the quinquennial mean was 40·48.

According to the distribution of deaths, the healthiest month of the year was November, closely followed by June, and the unhealthiest month was May: the death rate in May was 4·06 against only 1·80 per thousand in November.

The total number of deaths was 15,208, of which no less than 12,726 were recorded as due to fevers, 431 to dysentery and diarrhœa and 332 to respiratory

diseases. There was no death from plague, only 9 from cholera and 23 from small-pox. The largest number of fever deaths occurred in May; in 1913, March was the month of maximum fever mortality.

Haj Pilgrimage 1913-14.

84. The Haj was performed on the 8th November 1913. The total arrivals numbered 96,924 of whom those from India (Indians and Afghans) numbered 12,425, compared with 13,401 in the previous year. The decrease, it is suggested by the Vice-Consul of Jeddah, may be due partly to the monsoon and partly to increased rates of passage money from Bombay. According to the port health report of Bombay a total of 15,319 pilgrims embarked at Bombay, 11,139 of these belonging to India and Ceylon: the Indian pilgrims recorded as arriving at Camaran in 1913 numbered 11,840. The health of the pilgrims at the Haj was good and there was no outbreak of cholera as in the previous season. It is claimed that with the precautionary measures taken by the sanitary authorities, the repetition of such heavy mortality as the previous year had witnessed, even with an outbreak of cholera, is unlikely. Plague did not appear till late in the season, the first case occurring in Jeddah on the 1st February 1914, and another a few days later. The Sanitary Department is said to be doing good work and is helpful to pilgrims.

The return of the pilgrims was beset with fewer difficulties than usual; the total number, and consequently the number of pauper pilgrims to be disposed of, was smaller. The passage rates also fell owing to more competition.

Deaths of European Civil Officers and Pensioners.

85. During 1914, reports of the death of 98 European officers in civil employ and pensioners were intimated to this office. The following statement indicates the causes of death, and ages arranged according to six age groups.

Deaths from	Number of deaths.	Age at death.					
		Under 20 years.	20—30 years.	30—40 years.	40—50 years.	50—60 years.	60 years and over.
Malaria	5	...	1	1	1	...	1
Cholera	5	...	3	2	...	...	...
Enteric fever	3	...	1	1	1	...	...
Dysentery	1	...	...	1	...	...	...
Liver abscess	1	...	...	1	...	...	...
Small-pox	1	...	...	...	1	...	...
Rheumatism	3	...	...	...	2	1	...
Pneumonia	9	...	1	3	3	2	...
Tuberculosis	2	...	1	...	1	...	...
Appendicitis	2	...	...	1	1	...	...
Gastro-intestinal affections	9	...	2	1	4	...	2
Other respiratory diseases	8	1	...	3	1	...	3
Kidney diseases	5	...	1	1	...	1	2
Heart disease or heart failure	10	..	2	...	2	2	4
Other circulatory diseases	4	...	1	...	1	...	2
Malignant disease — Carcinoma	1	...	...	...	...	1	...
Malignant disease — Sarcoma	1	...	...	1	...	...	...
Epilepsy	2	...	...	1	1	...	...
Suicide	2	...	...	1	1	...	...
Death by misadventure	11	...	1	4	5	...	1
All other causes	13	...	2	3	2	3	1
Total	98*	1	16	25	27	10	18

* Including one death from malaria for which age period not known.

SECTION IV.

JAILS OF INDIA.

86. The prison population, excluding the Andamans, which had risen to 96,745 in 1913, rose to the high figure of 102,117 in the year under report, a figure 6,518 in excess of the average population of the preceding decade. Madras, Bihar and Orissa, and Burma alone showed a decrease in the average strength: all the other administrations had an increased prison population in 1914. The increase was most marked in the United Provinces.

Prison population in 1914.

87. Coincident with the increase in the prison population there has been an increase in the sickness and mortality rates. The admission to hospital rate rose from 540·2 per mille in 1913 to 548·3 and the death rate from 15·52 to 17·98 per mille. Both the rates are, however, well below the decennial average. It will be remembered that the death rate for 1913 constituted a record for Indian jails. Bihar and Orissa and the Central Provinces are the only two administrations whose jails returned a lower death rate than in 1913.

Sickness and mortality rates, excluding the Andamans.

Madras, which in 1913 returned the phenomenally low jail death rate of 7·74 per mille, has, with a rate of 12·44 in 1914, to yield pride of place to the United Provinces which returned a rate of 11·96 per mille. The Central Provinces follow closely on Madras; here the death rate in jails fell from 13·40 in 1913 to 12·61, a remarkable figure when compared with 20·30, the decennial average. The jails of no other administration had a death rate below 17 per mille. As usual Assam jails have far and away a higher death rate than any others: the rate rose from 40·67 per mille in 1913 to 43·45 in 1914 which is nearly 5 per mille above the decennial average. The Punjab has the next highest rate 25·95. These figures will be considered in greater detail when the individual provinces are under discussion.

The chief causes of sickness were:—

	ADMISSION RATE.		
	1914.	*1913.*	
Malaria	117·3	108·2	per mille.
Abscess, ulcer and boil	61·7	57·8	,,
Dysentery	60·1	55·6	,,
Diarrhœa	37·5	38·0	,,
Respiratory diseases	25·7	24·6	,,
Pyrexia of uncertain origin	18·6	24·5	,,
Anæmia and debility	11·8	10·6	,,
Pneumonia	10·8	9·0	,,
Tubercle of the lungs	9·8	9·2	,,

It will be noted that with the exception of diarrhœa and pyrexia of uncertain origin, all the above noted pathological conditions were more prevalent than in the previous year. The decline in the admissions for "pyrexia of uncertain origin" is noteworthy in a relatively unhealthy year, indicating, as it probably does, a greater precision in diagnosis.

The chief causes of death were:—

	DEATH RATE.		
	1914.	*1913.*	
Tubercle of the lungs	3·50	2·94	per mille.
Dysentery	2·62	2·16	,,
Pneumonia...	2·45	1·80	,,

All other diseases had death rates of less than 1 per mille. The three chief causes of death noted above were each responsible for more deaths than in the previous year.

Some of the chief causes of sickness and death will now be briefly referred to before passing on to a consideration of the health conditions of the jails of each province.

Malaria.

88. Once again malaria was responsible for almost twice as many admissions as any other disease: it was the direct cause of nearly a quarter of the sickness in Indian jails in 1914. From the subjoined table it will be noted that malaria was more rife than in either of the three preceding years. The increased incidence was not universal however: Burma, the United Provinces, the Punjab, the North-West Frontier Province, and Madras show actually diminished admission rates compared with 1913. Of the remaining provinces the greatest relative increased prevalence was experienced in the Bombay jails; here the malaria admission rate was more than double that of the previous year and the highest experienced in recent years.

Admission rates from malaria per thousand of average daily strength.

Province.	1894-1898.	1899-1903.	1904-1908.	1909.	1910.	1911.	1912.	1913.	1914.
Burma	159·5	131·6	45·2	35·5	45·4	44·0	30·4	23·6	23·0
Assam	450·8	305·3	328·2	573·9	229·6	197·6	152·5	154·3	200·9
Bengal	292·2	263·5	273·3	236·3	267·3	251·9	252·1	268·4	317·5
Bihar and Orissa ...	359·1	395·9	311·2	262·3	209·4	214·3	179·3	147·5	148·7
United Provinces ...	296·3	260·7	226·3	212·1	123·2	94·0	74·2	78·2	72·3
Punjab	680·5	560·5	255·4	139·3	116·0	98·2	137·3	101·6	98·9
North-West Frontier Province	819·3	437·1	532·1	504·4	353·1	197·6	337·9	506·0	380·4
Bombay	311·7	241·7	150·2	123·8	96·3	86·8	67·0	72·6	154·3
Central Provinces ...	273·9	329·5	193·5	151·3	104·8	65·7	49·5	28·2	29·3
Madras	150·4	100·3	73·2	81·0	94·2	64·2	94·1	32·0	28·6
India, excluding the Andamans	298·5	238·4	199·5	172·4	134·7	113·8	105·2	108·2	117·3

The North-West Frontier Province has, as usual, the highest admission rate though it was considerably less than in 1913. In the jails of Burma, the United Provinces and Madras, malaria was less prevalent than in any previous year.

The malaria death rate for the jails of India, 0·73 per mille, though higher than that of the two previous years, is still well below the average rate of the previous decade, 0·91 per mille.

Dysentery.

89. Both the admission rate and the death rate from this disease were higher than those of the previous year, 60·1 and 2·62 per mille, respectively, against 55·6 and 2·16 in 1913. As usual Assam jails have the highest dysentery death rate, 16·93 per mille: Madras, 0·99 and the United Provinces 1·24, return the lowest rates. The disease was much more prevalent in the Punjab than usual where it caused a death rate of 4·59, a figure more than twice as high as the average of the preceding decade and five times as high as that for 1913. Excluding the Punjab and Assam, the jail dysentery death rates for 1914 call for no special notice.

90. One has grown accustomed to see phthisis figuring as the chief cause of mortality in Indian jails and 1914 was no exception to the rule Excluding Bombay and the Central Provinces, all the administrations reported enhanced tubercle death rates in their jails in 1914. In no case, except that of the Punjab, was the increase a very serious one. In the Punjab, however, the abnormally high death rate of 7·30 per mille calls for comment and will be considered in greater detail later.

Tubercle of the lungs.

91. The jails of no province were completely free from this disease. In Bombay, however, it caused no deaths. The cholera death rate for the jails of the whole of India was only ·33 as compared with ·18 in 1913 and ·66 the mean rate of the previous decade. In only one province, Assam, did the cholera death rate exceed one per mille: here the rate was 1·13.

Cholera.

92. One hundred and eleven cases of enteric fever were recorded against 103 in 1913, a precisely similar rate per mille. The death rate was ·29 per mille.

Enteric fever.

Pyrexia of uncertain origin was responsible for an admission rate of 18·6 per mille (24·5 in 1913) and a death rate of ·06 (·09 in 1913).

Fevers of uncertain origin.

93. The average strength of prisoners rose from 11,273 in 1913 to 11,705 in the year under report, a figure which is 162 above the average for the previous decade. The constantly sick rate fell from 51 per mille in 1913 to 49. The death rate rose from 20·85 per mille in 1913 to 22·55 while the admission to hospital rate fell from 1,068·6 to 1,060·8 per mille. Only two other administrations in India had higher jail death rates, *viz.*, Assam and the Punjab. Of the 264 deaths that occurred, 53 were attributed to dysentery, 51 to tuberculosis, 25 to pneumonia and 16 to malaria.

Bengal.

There were five cases of cholera in five different jails: three of these proved fatal.

Dysentery was less prevalent and caused fewer deaths than in 1913, the admission rate and death rate being 167·3 and 4·53, respectively, against 181·5 and 5·85 in the previous year. It was once again, however, the chief cause of mortality. The subject of dysentery in the Bengal jails has received special attention at the hands of the Indian Research Fund Association. Unfortunately Captain Cunningham, to whom the inquiry was entrusted, had to revert to military duty before its conclusion: results of interest have, however, been obtained.

The autumn of 1914 in Bengal was severely malarious: this fact is reflected in the increased jail malaria admission and death rates, 317·5 and 1·37, respectively, against 268·4 and 0·98 in 1913. There were, however, only 3,500 attacks of malaria amongst 69,000 persons admitted during the year. Quinine prophylaxis was employed in all jails.

Only nine jails were free from tuberculosis in 1914. The disease appears to be increasing in severity in the Bengal jails: in the year under report there were 122 admissions and 51 deaths against 137 and 35 in 1913 and 133 and 35 in 1912. The pressing need of a separate jail for the segregation of tuberculosis patients is once more urged by the Inspector-General. More than one-third of the total cases occurred in the two big Calcutta jails.

Pneumonia was more prevalent than in the previous year though it caused fewer deaths. The increased prevalence is probably not unconnected with the increased amount of overcrowding that occurred.

Of 30,420 convicts discharged during 1914, 56·27 per cent. had gained in weight during their imprisonment; the weights of 20·60 per cent. had remained stationary; the remainder had lost weight.

Assam.

94. The average daily number of prisoners rose from 1,672 in 1913 to 1,772 in the year under report. There was overcrowding in two jails, Sylhet and Shillong.

The admission to hospital rate rose from 1,023 per mille in 1911 to 1,183 per mille, a higher figure than any recorded since 1909: the daily average sick was 45 per mille; the death rate, 43·45 per mille, was higher than in either of the two preceding years and has only once been exceeded in the last ten years. This death rate is very much larger than that returned for the jails of any other administration in 1914. These very unsatisfactory figures are perhaps a little misleading for in only two jails was there an increased mortality compared with 1913, *viz.*, Sylhet (33 deaths against 17 in 1913) and Tezpur (17 against 7). All the remaining jails had a reduced mortality rate. Half the deaths in Sylhet were due to dysentery. In Tezpur over 60 per cent. of prisoners were admitted in indifferent or bad health. The health conditions in the Assam jails are receiving most anxious attention at the hands of the local Government.

There were six cases of cholera with two deaths as against four and two in 1913. Only three jails reported cases.

Dysentery was responsible for an admission rate of 333 per mille and a death rate of 16·93 (303 and 11·96 in 1913). 17 of the 30 deaths occurred in Sylhet and 6 in Gauhati. The Inspector-General in Assam is of opinion that the prevalence of ankylostome infection in Assam possibly plays an important part in the etiology of dysentery in the jails and this aspect of the question is receiving well merited attention.

Malaria was considerably more prevalent though it was responsible for only six deaths (seven in 1913). Quinine prophylaxis was everywhere employed.

Fifteen cases of tubercle of the lungs were admitted to hospital of which five died. Three jails were responsible for all the cases, four of the five deaths occurred in Tezpur.

There was one case of enteric fever reported.

Diarrhœa was more prevalent than usual but was responsible for no mortality.

Of prisoners discharged 50·46 per cent. had gained in weight and 28·44 per cent. had lost in weight during confinement.

Bihar and Orissa.

95. In Bihar and Orissa there was a decrease in the prison population, the average strength being 6,525 as compared with 6,697 in 1913.

Coincident with this fall in the average strength there was a distinct improvement in the health conditions. Compared with 1913 the constantly sick rate fell from 32 to 30 per mille and the death rate from 20·01 to 17·62; the admission to hospital rate, however, rose from 715 to 734.

There were two cases of cholera reported, one from Darbhanga and one from Purulia: they both proved fatal. The source of infection was traced in neither case.

Dysentery was second only to tubercle of the lungs as a cause of death: it was less prevalent and caused fewer deaths, however, than in 1913: the admission and

death rates were 81·1 and 3·07, respectively, compared with 89·7 and 3·88 in 1913. Five of the twenty deaths occurred in Bankipur: they were admitted into jail in a bad state of health.

Malaria had an almost exactly similar incidence to that of the previous year: it was responsible for four deaths. Prophylactic quinine was administered in all but four jails with, it is believed, excellent results.

Tubercle of the lung was responsible for an admission to hospital rate of 11·5 and a death rate of 3·68 per mille as against 9·1 and 3·14, respectively, in 1913. It is stated that in almost every case the disease was contracted before admission to jail. There are proposals for the provision of isolation wards for tuberculosis cases in all the jails: at present such exist in only five jails.

Pneumonia was less prevalent than in 1913 and caused 27 admissions to hospital as against 44 in 1913.

An epidemic of mumps occurred in two jails and chicken-pox in one.

Of 16,572 convicts discharged during the year 56·95 per cent. gained weight and 18·71 per cent. lost weight during their imprisonment.

The United Provinces.

96. In spite of an increased jail population, the average strength was 24,912 against 21,822 in 1913, an increase of 14 per cent., the standard of health in the jails of the United Provinces was remarkably good. The constantly sick rate was 21 per mille, the same figure as for 1913; the admission to hospital rate fell from 406 to 397, and the death rate rose from 11·50 in 1913 to 11·96 in the year under report. The low death rate recorded is especially remarkable in a year when famine, scarcity, and distress resulting from the high price of food, prevailed: such conditions mean that a larger proportion of prisoners than usual are admitted into jail in poor health.

The United Provinces had a lower mortality rate in her jails in 1914 than any other administration. It must be remembered too that the prison population of the United Provinces is far and away greater than that of any other province: in fact in 1914 it amounted to very nearly a quarter of the total prison population of India (excluding the Andamans). The increase in the number of prisoners was probably in large measure due to the high prices of food grains prevailing.

The number of convicts released on account of sickness was 26 as compared with 24 in the previous year.

There were thirty-five cases of cholera of which twenty proved fatal. Sixteen of these deaths occurred in Bareilly Central Prison. Had it not been for this cholera outbreak the death rate of 1914 would have been even lower than the record rate of the previous year. In Bareilly infection was apparently fly-borne. Cholera was prevalent in the neighbourhood of all jails in which cholera cases occurred.

Dysentery was more prevalent than in 1913 though it caused fewer deaths (death rates 1·37 and 1·24 per mille respectively). This disease year by year plays a smaller and smaller part in the death rate of the jails of this province.

Malaria was responsible for more admissions to hospital than any other disease, 72·3 per mille, but the death rate it caused only amounted to ·64 per mille: quinine prophylaxis was everywhere employed.

Pneumonia caused 45 deaths as compared with 40 in 1913.

Tubercle of the lungs was responsible for more deaths than any other single disease and had a mortality rate of 1·93 per mille. This is slightly higher than the

rate for the preceding year but it is still well below the decennial average, 2·46 per mille. The disease was more prevalent, however, than for some years past; it is reported that a large number of prisoners suffering from tuberculosis were admitted into jail.

Punjab.

97. An average prison population that increased from 12,906 in 1913 to 14,375 in the year under report, a figure 32 per cent. in excess of the decennial average, and the withdrawal of a very large proportion of experienced Indian Medical Service jail superintendents, on their reversion to military duty, combined to make the administration of the Punjab jail department more than ordinarily difficult.

The constantly sick rate rose from 33 in 1913 to 34, the admission to hospital rate from 615 to 618 per mille and the death rate from 16·81 to 25·95 per mille, a figure 5 per mille above the decennial average. Three-fourths of this increased mortality occurred in two central Jails, Montgomery and Multan.

There were four admissions and two deaths from cholera, three in the Multan Central jail and one in Sialkot.

Dysentery was markedly more prevalent than in 1913: the hospital admission rate rose from 32 to 63 and the death rate from ·93 to 4·59. Every jail returned cases. Forty-two out of the total 66 deaths occurred in the Montgomery jail. The variation in case mortality in different parts of the province was most striking: thus, in the Multan Central Jail the case mortality was as high as 12·5 per cent., in Montgomery 10 per cent., whereas in Ambala sixty-four cases were treated without a single death.

Malaria was slightly less prevalent than in 1913; only three deaths were recorded. Quinine prophylaxis was universally adopted and the jail staff are everywhere convinced of its efficacy.

A still further increase in hospital admissions for, and deaths from, tubercle of the lung is again reported and reveals a serious state of affairs. The admission to hospital rate rose from 23·6 to 23·9, a figure 10 per mille above the decennial average, and the death rate rose from 5·89 to 7·30 per mille, a most unwelcome increase. In Montgomery Central Jail there were no fewer than 165 admissions with 44 deaths and in Multan 47 admissions with 22 deaths. Only seven jails out of the twenty-three were free from phthisis. The authorities are fully alive to the seriousness of the situation. The Shahpur district jail is to be used exclusively for the segregation of tuberculous prisoners whilst the original scheme for the provision of a special institution is being worked out. This should have an immediate effect on the incidence of the disease.

Pneumonia came third as a cause of mortality and was responsible for a death rate of 3·69 per mille.

North-West Frontier Province.

98. The average strength of prisoners was 313 in excess of that for 1913, 2,321 against 2,008. The constantly sick rate rose from 22 to 23 per mille, the death rate from 15·44 to 17·66 which is just above the decennial average, whilst the admission to hospital rate fell from 945 to 756 per mille.

Malaria was less prevalent than in 1913 and the admissions to hospital were only 380 per mille against 506 in the previous year: it caused five deaths. The Peshawar jail was the only one of the five in which the disease was widespread and

the admissions to hospital for malaria were here more than four times as numerous as in any other jail. Quinine prophylaxis was carefully carried out in all jails.

Dysentery was responsible for an admission rate of 65·1 per mille and caused five deaths.

Phthisis was responsible for six deaths in spite of the fact that only nine patients suffering from this disease were admitted to hospital. These figures denote a low incidence but a very high case mortality. Pneumonia caused 11 deaths and was thus the chief cause of mortality: the admission rate for this disease was 13·4 per mille as against 20·4 in the previous year.

Two deaths from enteric fever occurred in Dera Ismail Khan.

99. The year was a very healthy one in the jails of the Central Provinces and Berar.

Central Provinces and Berar.

In spite of an increase of prison population from 3,581 in 1913 to 3,726 the constantly sick rate fell from 12 to 11 per mille (average of previous decade 19). This figure is very much lower than that returned for the jails of any other administration. A still further fall in the death rate to 12·61 per mille from 13·40 which was the lowest ever recorded in the jails of this province, is eloquent testimony to the improved conditions prevailing. The average death rate for the decade 1904-13 was 20·30. Only two other administrations, the United Provinces and Madras, had a lower death rate in their jails in 1914, and the difference between the three rates is but trifling. Most of the deaths that occurred were amongst newly admitted convicts.

There were three cases of cholera, two of which proved fatal, all in Mandla jail.

Dysentery was responsible for a hospital admission rate of 42·1 and a death rate of 2·15 per mille as compared with 51·7 and 5·32, the decennial averages.

Malaria was little prevalent: there was no death attributed to this disease and the hospital admission rate was only 29·3 per mille (28·2 in 1913 and 138·6 the average of the decade). Quinine was employed as a prophylactic.

Tubercle of the lung shows a welcome decreased prevalence. There were 19 cases (5·1 per mille) with 7 deaths (1·88 per mille). The corresponding rates for 1913 were 7·8 and 3·07, respectively.

Pneumonia was rather more prevalent than in 1913, but the number of deaths attributed to it was 5 as compared with 7 in 1913.

There were two cases of enteric fever and one of small-pox.

Of the prisoners discharged during the year 67 per cent. had gained weight and 13 per cent. had lost weight.

100. Bombay jail death returns were not quite so satisfactory as they were in the previous year. The average jail population was higher, 9,873 as compared with 9,726; the constantly sick rate rose from 22 to 26 per mille; the hospital admission rate from 495 to 652 and the death rate from 15·42 to 17,02.

Bombay.

There was one case of cholera which recovered.

Dysentery was more prevalent than in 1913 and caused an admission rate of 44·8 and a death rate of 1·72 per mille (40 and 1·34, respectively, in 1913).

Malaria was twice as prevalent as in 1913 and had admission and death rates of 154·3 and 1·01 per mille, respectively, against 72·6 and 0·51. Quinine was used as a prophylactic in all jails in which malaria prevailed.

Tubercle of the lung caused 38 admissions and 13 deaths (39 and 14 in 1913). A special tuberculosis ward is to be built at the Yerrowda Central Jail.

There were 284 patients suffering from fevers of uncertain origin (273 in 1913); one died.

Pneumonia was twice as prevalent as in 1913 and caused a death rate of 5·06 (admission rate 17·3): it was the most important cause of mortality.

There were four cases of plague, all of whom contracted the disease before admission to jail.

Mumps was prevalent throughout the year: it was of a mild type.

Of the 20,427 prisoners discharged during the year 55·7 per cent. gained and 23·5 per cent. lost weight during their confinement.

101. Madras was one of the three administrations that had a diminished jail population in 1914, as compared with the previous year. The constantly sick rate remained at the same figure as in 1913, *viz.*, 16 per mille; the admission to hospital rate fell from 353 to 305; but the death rate rose from the phenomenally low figure of 7·74 to which it fell in 1913, to 12·44 per mille. Madras has this year, therefore, to take second place to the United Provinces in the matter of low death rates. The rate is still 5·47 below the average of the previous decade.

Madras.

Cholera was responsible for nine admissions and one death.

Dysentery was markedly more prevalent than in 1913 though still much less so than in the jails of most other administrations. The admission to hospital and the death rates caused thereby were 40·6 and ·99 per mille, respectively.

Malaria was responsible for an admission rate of 28·6 and a death rate of ·88. Quinine was used as a prophylactic in six jails.

Tubercle of the lung was widespread and more severe than in 1913. The admission rate rose from 6·6 to 7·3 and the death rate from 1·74 to 2·97 per mille which figure is slightly above the decennial average, 2·84.

Madura was the only jail that was free from the disease. Six of the total 27 deaths occurred in Vellore. Tubercle was responsible for more deaths than any other disease.

Of the 113 deaths that occurred 43 were amongst prisoners who had been in jail only six months or less.

Of the prisoners discharged during the year 65·46 per cent. had gained weight and 17·85 per cent. lost weight during confinement.

102. The average strength of prisoners fell from 16,748 in 1913, to 16,652 in the year under report.

Burma.

The constantly sick rate, 15, and the admission to hospital rate, 269, were exactly the same as in the previous year, but the death rate rose from 16·24 to 17·66 per mille, (decennial average 15·27). The admission to hospital rate was lower than that of the jails of any other administration.

The general health of the prisoners was fairly satisfactory.

There was only one case of cholera: it proved fatal.

Dysentery was less prevalent than in 1913, but caused 23 deaths (1·38 per mille). Many cases in the Burma jails are complicated with morphinism. Ankylostomiasis

was found to be common in Rangoon. Diarshœa was also much less prevalent than usual.

The prevalence of malaria was equal to that of 1913 and caused an admission rate of 23 per mille. There were five deaths ascribed to malaria. From these figures one would assume that there is less malaria in Burma than in any other Indian province. Quinine was used as a prophylactic in nearly all jails.

Tubercle of the lung was responsible for more deaths than any other disease: the phthisis death rate was 4·20 per mille, which is higher than the previous year's figure, 4, and the decennial average, 3·68. More than half the total deaths occurred in the two central jails, Insein and Rangoon, though their combined population is less than a third of the total prison population of Burma.

There were 34 cases of enteric fever eight of which proved fatal. Nine of these cases occurred in Moulmein jail the Superintendent of which is of the opinion that the disease is extremely prevalent in Moulmein town. In no case was the source of infection definitely traced.

There were five cases of plague (four at Rangoon, one at Bassein), all of which proved fatal.

There were 134 cases of mumps, 22 of influenza and 81 of measles. One of the latter died.

Morphinism was the cause of 216 admissions to hospital (203 in Rangoon) of which 19 died: 13·41 per cent. of the total convicts admitted to jail confessed to being opium eaters. Ankylostomiasis figured less in the reports of 1914 than in those of the previous year: it caused three deaths, however. Five patients died of "Whitmore's disease."

The Andamans.

103. The convict population was higher in 1914 than in any year since 1910 Figures for the last five years are:—

Year.	Males.	Females.	Total.
1910	11,787	636	12,423
1911	11,253	631	11,884
1912	10,690	590	11,280
1913	10,959	582	11,541
1914	11,423	573	11,996

The health conditions in the year under report were satisfactory. The improvement that has been effected within the past five years is well shown in the following table taken from the Superintendent's report.

Year.	Daily sick rate per mille.		Death rate per mille.	
	Labouring convicts.	Self-supporters.	Labouring convicts.	Self-supporters.
1910	106·6	8·8	44·51	18·08
1911	73·5	8·5	26·28	15·85
1912	88 1	9·9	34·20	18·49
1913	61·3	9·2	26·77	17·33
1914	52·0	8·0	27·38	12·36

In 1914 there were 284 deaths from disease, 23·67 per mille. There were also eighteen violent deaths.

The daily sick rate is the lowest ever recorded. Had it not been for an epidemic of enteritis, which caused 36 deaths, the death rate would also have been abnormally low. There was no death amongst the European or Indian troops stationed in Port Blair either in 1913 or 1914.

Pneumonia as usual caused most deaths, 65, followed by dysentery 39, acute infective enteritis 36, phthisis 31, malaria 21, other respiratory diseases 19. The deaths from no other single disease reached double figures.

Enteric fever was responsible for 11 admissions to hospital and 4 deaths. In no case was the source of infection traced.

Malaria was less prevalent than in either of the two previous years; nevertheless the admission to hospital rate, 840·1 per mille, is sufficiently high to demonstrate what an important factor malaria is in the health statistics.

The death rate was only 1·75 per mille, but the Superintendent states that malaria is the cause of the low vitality of the bulk of the convict population, and its eradication, if feasible, would have a most beneficent effect on the health generally. Some progress has been made with the reclamation of swamps but very large areas are still untouched. Of the 2,117 malaria patients in whose blood the parasite was found 53 per cent. were found to be suffering from malignant tertian malaria, 33 per cent. from benign tertian and 14 per cent. from quartan. There was one fatal case of blackwater fever.

Dysentery was more prevalent though less fatal than in 1913. The admission to hospital rate and the death rate were 85·9 and 3·25 per mille, respectively: both these figures are well below the decennial averages, 117·4 and 6·37. All dysentery patients who are well enough to be moved are now treated at Viper Hospital: convalescents are also segregated.

There were 106 cases of scurvy, two of which proved fatal: the vegetable supply was not satisfactory; steps have been taken to remedy defects.

There were 31 deaths from phthisis, a death rate of 2·58 per mille: this figure compares most favourably with that for 1913, 3·47, and the decennial average, 6·15. Improvement in the lighting and ventilation of barracks, recently effected, has been productive, apparently, of excellent results.

SECTION V.

VACCINATION.

104. The total number of vaccination operations in British India in 1914-15 was 9,462,901; primary cases numbered 8,212,851 against 8,730,984 in 1913-14 and re-vaccinations 1,250,050 against 1,146,102. Thus there was a decrease of 518,133 primary cases but an increase of 103,948 re-vaccinations, leaving a net deficit of 414,185 operations during the year. There was a decline in the work of the vaccination department in all the provinces except Madras, Coorg and Ajmer-Merwara: the largest decreases were in Bengal (256,799), Punjab (50,830), Burma (45,901), Central Provinces (19,733), Assam (16,633), North-West Frontier Province (10,674), Bihar and Orissa (9,906) and Bombay (9,725).

Vaccination in India.

The percentage of success in both primary work and re-vaccinations was lower in 1914-15 than in the previous year, 95·56 and 68·38 against 96·95 and 69·66 per cent., respectively. As regards the former the rates ranged between 99·68 per cent. in Bihar and Orissa and 90·8 per cent. in Madras: these two provinces also had the highest and lowest percentage rates in 1913-14. In re-vaccinations the highest rate was 88·39 per cent. in the North-West Frontier Province and the lowest 57·03 in Bombay.

The average number of operations performed by each vaccinator was 1,558 against 1,623 in 1913-14. The highest number, 3,965, was recorded in the North-West Frontier Province and the lowest, 907, in Assam.

At dispensaries 135,485 operations were performed against 184,979 in 1913-14. The bulk of these were done in Bengal and Bombay.

The ratio of successful operations per mille of population was 34·19 as compared with 36·19 in the previous year. The ratios varied much in the several provinces, being highest in Coorg, 74·08, followed by 50·05 in the North-West Frontier Province and 41·63 in Assam and lowest in Delhi 28·22, Ajmer-Merwara 29·81 and Bombay 29·88.

On an estimated birth rate of 40 per thousand of the population, 44·89 per cent. of children under one year of age were successfully vaccinated compared with 46·83 per cent. in 1913-14. The rates ranged between 74·44 per cent. in the Central Provinces and 20·65 per cent. in Bengal (excluding the small province of Coorg where the rate was only 9·63 per cent.).

The cost of the department increased from Rs. 17,06,426 in 1913-14 to 17,40,226 in 1914-15. The average cost of each successful case was three annas and four pies compared with three annas and one pie in the previous year: the variations were between eight annas and five pies in Bombay and Burma and one anna and two pies in Bihar and Orissa.

105. During the year 1914-15, there were 15,579 vaccination operations in the province against 15,922 in the previous year. Of the total, 12,220 were primary cases and 3,359 re-vaccinations against 11,450 and 4,472, respectively, the year before. The

Delhi.

percentage of success in primary cases was 98·91 against 98·23 in 1913-14, and in re-vaccinations 72·13 against 61·09. In the municipal area there was a decline in both primary cases and re-vaccinations. The decrease in primary work was only nominal: the decrease in re-vaccinations was due to the fact that small-pox was very little in evidence. In rural circles there was an increase in primary cases as compared with the previous year but in re-vaccinations there was a decrease, due probably to the same cause as in the municipal area. In the towns of Najafgarh, Mehrauli and Marela house-to-house vaccination was carried out with success. Glycerine calf lymph obtained from the Punjab Vaccine Institute, Lahore, was used, the quality being good.

On an estimated birth rate of 40 per thousand, 53·47 per cent. of children under one year of age were successfully vaccinated. In the Delhi municipality 2,975 infants were successfully vaccinated out of 6,157 available.

The cost of the department was Rs. 2,983 as compared with 2,973 in 1913-14, and the average cost of each successful case was four annas and three pies or seven pies more than in the previous year.

106. The number of operations performed during 1914-15 was 1,598,628 against 1,855,427 in the previous year. The primary cases numbered 1,137,879 and re-vaccinations 460,749 compared with 1,574,190 and 281,237, respectively, in 1913-14, showing a decrease of 436,311 in the case of the former and an increase of 179,512 in the latter. The rates of success were 97·66 and 64·01 per cent., respectively, against 98·76 and 64·18. Compared with 1913-14, only 8 out of 28 districts showed an increase in the number of operations performed. In primary vaccinations there were increases in only two districts, *viz.*, Bakarganj (9,671) and Calcutta (837). The decrease in primary vaccinations was thus almost universal in the province and was strikingly large in the Eastern Bengal districts, Mymensingh recording 82,056, Tipperah 56,425, Faridpur 49,483, Dacca 34,623, Noakhali 19,732 and Chittagong 15,497, representing over 59 per cent. of the total decrease in the presidency. The large decrease in the Eastern Bengal districts is more apparent than real, the figures for the year under report being more accurate, due to inspections by Deputy Sanitary Commissioners and to measures taken to prevent the falsification of returns and to the figures of the previous year being totally unreliable.

Bengal.

On an estimated birth rate of 40 per thousand of the population, 20·65 per cent. of the infants were successfully vaccinated against 33·39 per cent. the year before. The low rate of infant protection is due, as was stated in the report for last year, to the backward condition of vaccination in the Eastern Bengal districts where there is great opposition to vaccination, especially of infants.

The different methods of vaccination yielded percentages of success as follows (the figures in brackets are for the previous year) :—primary cases—lymph direct from the calf 96·81 (97·69), lanoline lymph 96·58 (98·76), arm-to-arm 92·73 (94·91): re-vaccinations—70 40 (50·98), 63·13 (55·70) and nil, respectively. Arm-to-arm vaccination has been practically done away with except in Darjeeling where 867 such operations were performed.

At the Animal Vaccine Depôt 2,454 calves were vaccinated during 1914-15 against 2,212 in the previous year and the quantity of lymph manufactured was 772,587 grains as compared with 744,054 grains.

The cost of the department fell from Rs. 1,98,163 to Rs. 1,95,211: the cost of each successful case was two annas and three pies against one anna and ten pies in the previous year.

Bihar and Orissa.

107. There were 1,314,042 vaccination operations performed in the province during 1914-15, a decrease of 9,906 compared with 1913-14. Of the total number of operations 1,245,824 were primary cases and 68,218 re-vaccinations, against 1,283,557 and 40,391, respectively, in the previous year. The decrease in primary cases is attributed to malaria and the prevalence of cholera, the inexperience of the subordinate inspecting staff and to the irregular and insufficient supply of vaccine: also unsatisfactory work of some vaccinators: the increase in re-vaccinations is ascribed to greater attention being paid to it on account of outbreaks of small-pox in several districts. In Manbhum generally, and in the Jherria coal fields especially, the people willingly accepted re-vaccination though they were strongly opposed to it in previous years. The Bengal Vaccination Act was extended to the Tata Iron Factory at Sakchi, referred to in last year's report.

The quality of the work was better than in the previous year, the percentage of success in primary cases and re-vaccinations being 99·68 and 72·63, respectively, against 99·66 and 71·10.

On an estimated birth rate of 40 per thousand of the population, 45·52 per cent. of infants were protected, against 46·97 in 1913-14.

The Vaccine Depôt at Namkun was completed about the middle of the year and the work of manufacturing lymph was started in the middle of September. From September 1914 to 31st March 1915, 507 calves were vaccinated and yielded 94,180 grains of crude lymph. The local vaccine depôt could not, however, supply the whole province and the supply had to be supplemented from the United Provinces Vaccine Depôt.

The cost of the department rose from Rs. 93,373 in 1913-14 to Rs. 98, 421. Each successful case cost one anna and two pies, an increase of one pie on the cost in the previous year.

Assam.

108. The total number of operations performed during the year by all agencies was 320,016 of which 280,292 were primary operations and 39,724 re-vaccinations, as compared with 336,649, 301,241 and 35,408, respectively, in 1913-14. The decrease in the number of primary cases is attributed partly to the relaxation in supervision caused by the withdrawal of permanent civil surgeons for military duty, and partly to the lack of attention the work receives from many civil surgeons. The question of the practice of employing licensed vaccinators in certain districts, to which reference was made in last year's report, was considered and the system found quite unsuited to Assam. In the Kamrup district the prejudices of the "Mahapurushias" are being gradually overcome, 8,900 having been vaccinated during the year.

The percentage of success in primary cases and re-vaccinations was 96·22 and 68·69, respectively, compared with 98·41 and 78·15 in the previous year. The lower percentage of success is said to be due to the issue of lymph of a low degree of potency during the months of October and November: steps are being taken to ensure that a more potent strain is available for use next autumn.

There was an increase in the number of operations performed by dispensary staffs, 2,209 against 1,324 in the previous year.

On an estimated birth rate of 40 per thousand of the population 24·86 per cent. of infants were successfully vaccinated against 27·28 per cent. in 1913-14.

At the Vaccine Depôt 547,447 capillary tubes were loaded against 1,875,886 in the previous year. The decrease is due to the discontinuance of the supply of lymph to the Eastern Bengal districts from the 1st September 1914. The number of calves inoculated was 394 against 892 in 1913-14.

The cost of the department was Rs. 62,170 against Rs. 64,426 in 1913-14 and the average cost of each successful case, three annas and seven pies against three annas and four pies.

United Provinces.

109. The total number of vaccination operations fell from 1,660,820 in 1913-14 to 1,654,384, a decrease of 6,436. There was an increase of 11,349, in primary vaccinations, 1,543,567 against 1,532,218, but a decrease of 17,785 in re-vaccinations, 110,817 against 128,602. Thirty-eight out of forty-eight districts show an increase in primary work.

The percentage of success in primary cases was 97·35 and in re-vaccinations 71·76. The corresponding figures for 1913-14 were, 96·08 and 72·44, respectively.

On an estimated birth rate of 40 per thousand, 54·46 per cent. of the infants were successfully vaccinated, a slight increase compared with 54·08 per cent. the corresponding figure for the previous year. In municipal towns the number of successful vaccinations performed on children under one year of age was 85,085 against 81,670 in 1913-14.

At the Patwa Dangar Vaccine Depôt 538 calves were vaccinated against 387 in 1913-14. The total quantity of crude lymph obtained was 19,237 grammes against 14,716 grammes in the previous year. The decrease in the average yield of lymph per calf was due to the contractor failing to supply an adequate number of buffalo calves, from which the yield of lymph is greater than from cow calves. From the 19,237 grammes of crude lymph 108,932 grammes of glycerinated lymph, 2,408 grammes of glycerine paste and 8·5 grammes of lanoline paste were prepared. The strain of lymph was satisfactory; its potency was occasionally fortified by passage through rabbits. Four more districts were added to those in which arm-to-arm vaccination has been entirely replaced by calf lymph vaccination, bringing the total number of such districts to 41. It is expected that the remaining seven districts will purchase calf lymph in future and thus do away entirely with arm-to-arm vaccination.

The installation of a cold storage plant and the construction of a combined engine house, calf operating room and storage rooms, at the vaccine depôt, which will supply a long felt want, was nearing completion when the year closed.

The cost of the department amounted to Rs. 2,07,168 against Rs. 2,01,539 in 1913-14 and the average cost of each successful case was the same as the year before, one anna and eleven pies.

Punjab.

110. The total vaccination operations performed in the province amounted to 836,639 as compared with 887,469 in 1913-14. Of the total 671,261 were primary cases and 165,378 re-vaccinations against 671,183 and 216,286, respectively, in the year preceding. The decrease in re-vaccinations, 50,908, is ascribed to the greater prevalence of small-pox in the previous year and the consequent increased demand for protection. The quality of the work was not quite as good as in the previous year,

the percentage of success in primary cases being 97·13 and in re-vaccinations 70·69 against 97·40 and 71·07, respectively. In 14 districts there was an increase in primary vaccination : it was most marked in Lyallpur where it amounted to 3,746, Rohtak 1,896, and increases of more than 1,000 were recorded in Amritsar, Hissar, Montgomery and Ludhiana. There was a decrease in 14 districts, being most marked in Dera Ghazi Khan (4,135), Muzaffargarh (3,842), Multan (3,010), Rawalpindi (1,839), Hoshiarpur (1,351) and Jhang (1,308). In Dera Ghazi Khan the decrease is attributed to the fact that a large number of vaccination operations were performed in the hills beyond the administrative border in the previous year, and in the other districts to the smaller number of children available owing to the prevalence of plague, malaria and famine, when the people left their homes for other places. Great opposition to re-vaccination is still experienced in all parts of the province. House-to-house vaccination is not appreciated by the people in most districts and no attempt therefore was made to extend it.

On an estimated birth rate of 40 per thousand of the population, 66·88 per cent. of the children under one year of age were successfully vaccinated compared with 67·42 in the preceding year. In municipalities where the Vaccination Act is in force, 79 per cent. of the available children were protected against 78 per cent. in 1913-14. In towns where the Act is not in force the percentage was 67 against 69 in the previous year. The attention of municipalities was invited to the orders of Government and they were urged to realize more fully their responsibility in the cause of vaccination and to co-operate with the vaccination staff.

During the year 31,726 tubes of vaccine lymph were issued from the Punjab Vaccine Institute against 33,329 in the previous year. The insertion success reported was 96·10 per cent. in primary and 63·44 per cent. in re-vaccinations, against 95·17 and 69·01, respectively, in the previous year. Ten thousand capillary tubes of vaccine lymph were issued to the military authorities for use out of India.

The cost of the department was Rs. 1,46,947 against Rs. 1,33,731 in 1913-14 and the average cost of each successful case was three annas and three pies against two annas and ten pies in the previous year.

North-West Frontier Province.

111. Of the total of 154,179 vaccination operations performed during the year, 141,546 were primary and 12,633 re-vaccinations, showing decreases of 10,674, 4,294 and 6,380, respectively, compared with 1913-14. The decrease is mainly attributed to the antipathy of the people to having themselves and their children vaccinated in the absence of small-pox in the vaccination season. The percentage of success was 98·66 in primary and 88·39 in re-vaccinations against 99·01 and 91·22, respectively, in the previous year.

In the agencies also there was considerably less activity in vaccination work. The total number of persons vaccinated was 7,541 against 11,443 in 1913-14. This is due to the prevalence of cholera during the year in the Kurram Agency, when it was considered advisable to suspend vaccination operations, and in Tochi owing to the unsettled state of the country. In Chitral the modern method of vaccination is popular and the Mehtar of Chitral continues to give his sympathetic support to the work.

On an estimated birth rate of 40 per thousand of the population, 71·33 per cent. of the children under one year of age were successfully vaccinated compared with 76·35 per cent. the year before. In six out of thirteen municipal towns the number of infants successfully vaccinated exceeded the number calculated to be available :

this is explained by defective registration and by the floating population composed of trans-frontier tribes submitting their children to vaccination while passing through these centres on their way to or from independent territory. This was especially noticeable in Peshawar city where 7,133 infants were successfully vaccinated against 1,761 infants available. Glycerinated lymph was as usual obtained from the Punjab Vaccine Depôt and gave satisfactory results.

The cost of the department amounted to Rs. 15,171 against Rs. 15,241 in 1913-14 and the average cost of each successful case was one anna and eight pies, one pie more than in the previous year.

Central Provinces.

112. There was a decrease from 622,376 to 602,643, in the total number of vaccination operations in the Central Provinces, excluding the Feudatory States. The decrease was in re-vaccinations only, primary cases numbering 526,214 against 522,718 and re-vaccinations 76,429 against 99,658 in 1913-14, respectively. The decrease is attributed to outbreaks of plague and to the transfer of officers, owing to the war, which hindered the work. Of 22 districts there were decreases in 13: the larger decreases occurred in Narsinghpur (6,369), Chanda (5,553), Buldana (5,023), Balaghat (3,818), Mandla (2,238), Yeotmal (2,205) and Nagpur (2,069).

The percentage of success in primary cases was 97·21 and in re-vaccinations 63·27 per cent. compared with 97·85 and 65·11 in 1913-14, respectively.

During the year the rotary lancet used in the Bombay Presidency was introduced with good results. The issue of certificates to schoolmasters who have rendered assistance in the cause of vaccination is being taken up in many districts: in the Balaghat district lectures on the value of vaccination were delivered at fairs.

On an estimated birth rate of 40 per thousand of the population, 74·44 per cent. of the children under one year of age were successfully vaccinated as compared with 73·14 in the previous year. In municipalities the percentage of children vaccinated in towns rose from 84 to 91 per cent.

Five districts were supplied with lymph from the Central Vaccine Depôt, all the others prepared their lymph locally. Owing to limited accommodation sufficient lymph could not be prepared for supply to the whole province. The depôt buildings are in course of construction and when completed, their outturn of lymph will be sufficient for the whole province.

The cost of the department was Rs. 95,604 against Rs. 84,241 in 1913-14: the cost of each successful case was two annas and six pies against two annas and three pies in the previous year.

Madras.

113. In 1914-15 there was again an increase in vaccination work, a total of 1,688,922 operations being performed against 1,677,696 in 1913-14, and 1,586,344 in 1912-13. The primnry cases numbered 1,512,515 and re-vaccinations 176,407 against 1,527,112 and 150,584 in 1913-14, respectively. The decrease in primary cases is attributed to the absence of small-pox, failure to appoint efficient substitutes for vaccinators on leave, and prevalence of cholera: the vaccination staff is stated to be inefficient. The question of improving the pay and prospects of the subordinate vaccination staff is being taken up with a view to improving the quality of their work.

The percentage of success showed a slight decrease, 90·8 per cent. in primary cases against 91·8 in 1913-14 and 79·1 per cent. in re-vaccinations against 80·5.

On an estimated birth rate of 40 per thousand of the population, 38·41 per cent. of children under one year of age were successfully vaccinated as compared with 37·03 per cent. in the previous year. In municipalities 47,115 children under one year of age were protected out of 63,371 available infants.

From the Vaccine Section of the King Institute, vaccine was supplied for 1,983,417 cases, an increase of 11,252 cases over the previous year. There was a great fall in the amount supplied to "Government officers including jails" and a slight fall in the demands of the military department. The lesser issues were largely due to the fact that the amounts supplied to the Superintendent of Vaccination, Secunderabad, and the Vaccinator, Bolarum, have been shown separately and not included among the supplies to Government officers and the military department as heretofore. The bulk of the vaccine issued was in the form of lanoline paste: glycerinated lymph continued to be taken by Madras City and Colombo. There was a fall of 0·86 in the percentage of success during the year compared with 1913-14. The percentage of success from April to September was between 95·76 and 92·14, while from October to March the rate was between 90·64 and 87·45 per cent.: this result is directly opposite to that of previous years when the higher percentage of success was secured in the cold weather—no explanation is available. A number of experiments were carried out with a view to ascertaining whether glycerine lymph of greater keeping properties could be devised but without much success: further experiments are being conducted.

The cost of the department was Rs. 3,48,066 as compared with Rs. 3,37,686 in the previous year and the cost of each successful case was three annas and ten pies against three annas and eight pies in 1913-14.

Coorg.

114. The total number of vaccination operations in Coorg was 14,621 against 13,666 in 1913-14. There were 8,825 primary operations and 5,796 re-vaccinations. The quality of the work was better in the year under review in primary cases, the percentage of success being 96·71 against 94·92; in re-vaccinations there was a falling off, the figures being 85·33 against 87·00 in 1913-14.

On an estimated birth rate of 40 per thousand of the population, 9·63 per cent. of infants were successfully vaccinated as compared with 11·10 in the previous year. In the municipal towns of Mercara and Virajendrapet, the number of births during the year ending the 30th September 1914 was 203; of this number 147 were available for vaccination, 116 infants being successfully vaccinated.

The cost of the department amounted to Rs. 3,027 against Rs. 2,898 in 1913-14 and the average cost of each successful case was three annas and ten pies against three annas and seven pies in the previous year.

Bombay.

115. There were 774,775 vaccination operations in the Bombay Presidency as compared with 784,500 operations in 1913-14. The number of primary cases closely approximated in the two years, 711,179 and 711,115, respectively, but there was a great decrease in re-vaccinations, 63,596 against 73,385 in 1913-14—due to the lessened incidence of small-pox during the year. The quality of the work was better than in 1913-14, the percentages of success in primary cases and re-vaccinations being 99·10 and 57·03 against 98·73 and 55·86.

On an estimated birth rate of 40 per thousand of the population, 59·99 per cent. of the children under one year of age were successfully vaccinated against 57·15 per cent. in the previous year.

The majority of the operations were performed with glycerinated calf lymph manufactured at the Belgaum Vaccine Institute. There was a great increase in the supply of doses, 1,041,400 against 874,518 in 1913-14. The case and insertion success rates in the presidency excluding Sind were 99·59 and 97·48, respectively, against 99·18 and 96·15, respectively, in the previous year.

The cost of the department, which had fallen to Rs. 3,63,910 in 1913-14 from Rs. 3,76,586 in 1912-13, fell further to Rs. 3,55,759 and the average cost of each successful case to eight annas and five pies from eight annas and nine pies in 1913-14 and nine annas and two pies in 1912-13.

Burma.

116. There was a decrease in vaccination operations in Burma as compared with the two previous years, the figures being 472,567 against 518,468 in 1913-14 and 544,352 in 1912-13. There were 405,724 primary cases and 66,843 re-vaccinations against 426,177 and 92,291, respectively, the previous year. The decrease is attributed to the general freedom from small-pox of nearly every district in the province. In primary operations the largest decreases occurred in the Kyaukpyu district (13,114), Pegu (5,965) and Magwe (5,265): Tharrawaddy was the only district which showed any considerable increase in primary operations—1,064 more than in the previous year.

The percentage of success in primary cases was 94·92 and in re-vaccinations 60·54, both lower than the rates for 1913-14, which were 96·55 and 65·31, respectively

On an estimated birth rate of 40 per thousand of the population, 22·34 per cent. of the children under one year of age were protected as compared with 21·11 per cent. in the previous year. Of 20,108 infants available in towns and notified areas, 20,136 were successfully vaccinated. The excess is due to defective registration and in the case of some towns, to immigration of infants born outside.

The total outturn of lymph from the vaccine depôt at Meiktila was 776,432 doses as compared with 806,660 in 1913-14. The new building for the laboratory of the depôt has been completed; a refregerating plant has been installed and worked satisfactorily. Five native superintendents and 35 vaccinators were trained: of this number 31 qualified within the prescribed period of three months.

The cost of the department amounted to Rs. 2,06,269 as compared with Rs. 2,04,873 in the previous year. The average cost of each successful case was eight annas and five pies against seven annas and six pies in 1913-14.

Ajmer-Merwara.

117. The total vaccination operations in Ajmer-Merwara increased to 15,906 from 15,292 in 1913-14. There were 15,805 primary cases and 101 re-vaccinations against 15,260 and 32, respectively, in the previous year. The percentage of success in primary cases was 97·23 as compared with 98·05.

On an estimated birth rate of 40 per thousand of the population, 60·30 per cent. of the children under one year of age were protected against 60·90 the year before.

The cost of the department was Rs. 3,430 against Rs. 3,352 in 1913-14 and the average cost of each successful case was three annas and eight pies or one pie less than in 1913-14.

Vaccination amongst troops.

118. Particulars of vaccination in the army will be found in Statement III, Appendix to Section V, of the Annual Report of the Sanitary Commissioner with the Government of India.

SECTION VI.

MEDICAL INSTITUTIONS.

(*CONTRIBUTED BY THE DIRECTOR-GENERAL, INDIAN MEDICAL SERVICE.*)

I.—*State-Public, Local Fund and Private-aided Civil Hospitals and Dispensaries.*

119. The subjoined table shows the number of these institutions open at the close of 1913 and 1914, respectively, in each province, and compares the number of in-patients and out-patients treated and the number of operations performed in these two years. In the latter year the number of institutions in all India increased by 21, the number of in-patients by 16,661, the number of out-patients by 1,180,942, and the number of operations by 49,155.

India.

Province.		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of Patients.	Number of Operations.
Delhi	1913	13	4,503	296,236	300,739	9,420
	1914	14	4,964	287,074	292,038	11,188
Bengal (excluding Calcutta) ...	1913	402	36,848	3,844,942	3,881,790	114,503
	1914	414	38,056	4,020,643	4,058,699	116,304
Calcutta	1913	15	29,436	313,796	343,232	35,661
	1914	15	29,083	319,062	348,145	36,449
Assam	1913	163	9,993	1,585,477	1,595,380	25,696
	1914	155	11,457	1,606,259	1,617,716	26,516
Bihar and Orissa	1913	197	30,010	2,136,182	2,166,192	101,509
	1914	209	31,593	2,230,361	2,261,954	110,562
Central Provinces	1913	173	14,075	1,660,905	1,674,980	47,622
	1914	179	15,418	1,731,006	1,746,424	49,029
United Provinces	1913	393	75,826	4,318,651	4,394,477	212,769
	1914	398	75,426	4,432,919	4,508,345	217,014
Punjab	1913	296	85,198	4,505,979	4,591,177	250,261
	1914	297	88,774	4,778,611	4,867,385	260,775
Burma	1913	195	62,156	1,552,313	1,614,469	45,473
	1914	200	63,920	1,602,282	1,666,202	51,491
Bombay	1913	345	59,868	2,295,752	2,355,620	97,824
	1914	353	61,786	2,423,987	2,485,773	101,467
Madras	1913	549	87,220	6,418,778	6,505,998	253,484
	1914	530	91,565	6,652,153	6,743,718	259,566
North-West Frontier Province ...	1913	53	14,495	839,564	854,059	35,815
	1914	53	14,084	879,421	893,505	39,053
Baluchistan	1913	26	5,524	263,972	269,496	5,633
	1914	24	5,597	249,711	255,308	5,411
Total ...	1913	2,820	515,052	30,032,547	30,547,609	1,235,670
	1914	2,841	531,723	31,213,489	31,745,212	1,284,825

120. There were 11 Local Fund and 3 private-aided institutions open during the year as against 10 and 3, respectively, during the previous year. There was an increase of 461 among in-door patients, but a decrease of 9,162 among the out-door patients, or a net decrease of 8,701 in the total number of patients treated. The number of operations increased by 1,768.

Delhi.

The total expenditure amounted to £8,560. The sum of £72 was received as subscriptions from Indians.

121. The number of institutions remaining open at the close of the year was 414 as compared with 402 at the end of the previous year, or an increase of 12. The increase in the total number of patients treated was 176,909. Some outlying dispensaries had to be closed temporarily towards the end of the year owing to the shortage in the establishment of civil Sub-Assistant Surgeons, a number of whom were deputed to military duty.

Bengal (excluding Calcutta).

The difficulty in regard to nursing arrangements in *mofussil* hospitals continues, but the Bengal Nursing Association at some of the centres has made a beginning with the training of Indian women as nurses.

The total expenditure amounted to £71,539, which included a sum of £11,059 subscribed by Indians.

122. The number of institutions was the same as in the previous year, *viz.*, 15, and there was but slight variation in the total number of patients treated.

Calcutta.

The scheme for associating members of the independent medical profession with the staffs of Government hospitals as Honorary Surgeons and Physicians was introduced into two selected hospitals in the middle of the year. The scheme is reported to have worked smoothly and well, but is of too recent introduction to permit of any definite conclusions being drawn.

123. Although the number of institutions remaining open at the close of the year decreased by eight as compared with previous years, there was an increase of 22,336 in the total number of patients treated.

Assam.

During the year it was found necessary to close 20 out of 26 travelling dispensaries in order to meet the demand for civil Sub-Assistant Surgeons for military duty. A total of 42,202 patients was treated at these dispensaries during the year. The deputation of Civil Sub-Assistant Surgeons to military duty led to a number of resignations, and some of the least important branch dispensaries had also to be closed.

The total expenditure amounted to £10,733, of which sum Indians contributed £1,426.

The total number of patients treated at fairs was 104,391, or an increase of 3,333 as compared with 1913.

124. At the close of the year there were 12 more institutions than in 1913, and the total number of in-patients and out-patients treated increased by 95,762. More institutions are needed, as the existing number is insufficient for the medical needs of the province. The opening of new institutions is mainly dependent on the activities of district

Bihar and Orissa.

boards, and as the financial position of the boards was materially improved towards the fall of the year, it is anticipated that in 1915 there will be an appreciable addition to the number of medical institutions in the province.

During the year one floating and four travelling dispensaries treated a total of 28,084 patients. There were also seven other travelling dispensaries under the control of the provincial Sanitary Commissioner at which 36,954 patients were treated, and medical relief was also afforded to 65,025 patients by the system of deputing the medical officers attached to certain dispensaries to visit neighbouring fairs and markets.

The total expenditure during the year amounted to £55,225, or an increase of £8,920 over the expenditure of the previous year, towards which the contributions from Indians amounted to £7,197.

Owing to the war, several officers of the Indian Medical Service were withdrawn from the province for military duty, their places being filled by civil Assistant Surgeons and local planters' doctors. Notwithstanding the deficiency in the strength of the superior medical staff, the work of the department was on the whole carried on smoothly and satisfactorily.

Central Provinces.

125. At the end of the year there were six more institutions on the list than at the close of 1913, and there was an increase of 71,444 in the total number of patients treated during the year. The institutions of most of the districts in the province had increased attendances.

The number of epidemic travelling dispensaries under the control of the Sanitary Commissioner was the same as in the previous year, *viz.*, 13. In the middle of the year three other peripatetic dispensaries were opened as an experimental measure in certain selected unhealthy areas, and the experiment is to be continued during 1915 with a view to appraising the value of such institutions.

The total expenditure of the year amounted to £60,679, or an increase of £18,679 over the expenditure of the previous year. The subscriptions from Indians continue to increase: the subcriptions during the year amounted to £7,452, an increase of £1,452 over the figure for the previous year.

The question of charging well-to-do persons for medicines obtained from charitable dispensaries is engaging attention.

A number of officers of the Indian Medical Service and military Assistant Surgeons were withdrawn for military duty on account of the war, their places being taken by retired military Assistant Surgeons and civil Assistant Surgeons.

United Provinces.

126. The year ended with five more institutions on the rolls than at the corresponding period of the previous year, and while the number of in-patients treated during the two years was practically the same, the number of out-patients showed an increase of 114,268 over the attendance in 1913.

There were 87 travelling dispensaries at work during the year as compared with 85 during the previous year, and it was anticipated that seven more would be added by the middle of 1915. Forty-seven of the institutions open during the year belonged to district boards and the remainder were provincial institutions.

The total expenditure of the year was £101,645, or £6,645 more than that of 1913. The contributions from Indians amounted to £8,451, or a decrease of £1,049 as compared with the previous year.

The system of charging fees to well-to-do patients was introduced, and

although patients at first were very reluctant to pay for medicines and operations, the measure does not appear to have affected the attendance.

Many officers of the Indian Medical Service and Indian Subordinate Medical Department were withdrawn from the province for military duty on account of the war, their places being taken by civil Assistant Surgeons, who, so far as could be judged by the end of the year, had proved satisfactory substitutes.

Punjab.

127. The number of institutions open at the close of the year was 297, an increase of one over the figure of the previous year. The total number of patients treated increased by 276,208: in-patients by 3,576 and out-patients by 272,632. A satisfactory feature about the year's work was the increase in the female attendance, both as in-door and out-door patients, the increase being general and not confined to any particular class or community. The number of dispensaries in many districts is reported to be quite inadequate and the matter is receiving attention. Efforts are being made by local bodies to improve the dispensary buildings and equipment according to modern requirements, but much still remains to be accomplished in this direction.

The total expenditure of the year was £91,093, an increase of £5,093 over the expenditure of 1913. The subscriptions from Indians amounted to £2,230, or £170 less than in the previous year.

The superior staff was considerably depleted owing to the recall to military duty of officers of the Indian Medical Service and military Assistant Surgeons. Some of the posts vacated by the former were filled by civil Assistant Surgeons, while others were held as additional charges by the Indian Medical Service officers remaining in the province. Many civil Sub-Assistant Surgeons were also deputed to military duty.

North-West Frontier Province.

128. The number of institutions remained the same as in 1913, but there was an increase of 39,446 in the total number of patients treated, the increase being among out-patients entirely. There was, however, an increase of nearly 300 among the in-door female patients at the special female hospitals at Kohat, Peshawar and Dera Ismail Khan.

There were three travelling dispensaries at work.

The total expenditure amounted to £14,371, or £1,229 less than the previous year's outlay. The subscriptions from Indians continue to be very low; the amount subscribed during the year was £109, or £26 less than in 1913.

Baluchistan.

129. The number of institutions remaining open at the close of the year was 24, or two less than in the previous year. Owing to the recall to military duty of the military Sub-Assistant Surgeons lent to the province, the civil dispensaries at Rohlu and Barkhan had to be closed in August 1914. The total number of patients treated was 14,188 less than in 1913; the total number of in-patients increased by 73, while the out-patients decreased by 14,261.

The total expenditure was £6,006, or £4,636 less than the outlay in 1913. Considerable improvements were made to the Quetta civil hospital and to the female and jail wards at Fort Sandeman.

The medical service of the Zhob Militia has been placed under the administrative control of the Chief Medical Officer in Baluchistan.

On the outbreak of war, the 35 military Sub-Assistant Surgeons lent to the province, and who formed the bulk of its medical personnel, were withdrawn for military duty, their places being taken by retired medical subordinates, private practitioners, and medical mission employeés, and in some cases the charges rendered vacant were held by military Sub-Assistant Surgeons as collateral charges.

Burma.

130. At the close of the year there were five more institutions on the list than at the end of 1913. The in-patients increased by 1,764 and the out-patients by 49,969, or a total increase of 51,733 as compared with the previous year.

The scheme for training men of the compounder class as ward-assistants to help in the work of nursing in hospitals was further extended. A scheme was also sanctioned for the entertainment of five Burmese and Karen women annually for a two years' course of training in sick-nursing.

The total outlay amounted to £1,32,231, or £21,437 more than the expenditure of the previous year; over £13,333 of the excess was on account of the construction of hospitals and dispensaries.

A local society for the prevention of infantile mortality, was formed at Akyab on the initiation of an officer of the Indian Medical Service, and the labours of the society met with encouraging results.

Bombay.

131. The year closed with eight more institutions than in 1913. As compared with the latter year, there was an increase of 130,153, or 5·5 per cent. in the total number of patients treated, the increase among in-patients being 1,918 and among out-patients 128,235. There was an increase of 13·7 in the attendance at female hospitals and dispensaries.

A high standard of surgical work was maintained and the results obtained were on the whole excellent.

The total expenditure amounted to £167,239, or an increase of £12,239 over the previous year's figure. The subscriptions from Indians amounted to £2,306, or £1,363 more than in 1913.

Madras.

132. The number of institutions open at the end of the year was 19 less than at the close of 1913. As compared with the attendance of 1913, the in-patients showed an increase of 4,345, and the out-patients of 233,375, or a total increase of 237,720.

Although the total number of operations increased by 6,082, the increase was confined to minor operations. The frequent changes in the superior staff owing to the recall of officers to military duty caused a falling off in the number of important operations.

The system of appointing a certain number of young medical graduates as house surgeons and physicians to the principal hospitals in Madras and the *mofussil* was introduced, the intention being to improve the education of the graduates by practical training under experienced officers, as well as to guide the selection of men for service under Government. The scheme did not meet with the success anticipated. At the end of the year there were 16 of these graduates in the Madras city hospitals, and nine in *mofussil* hospitals.

The total expenditure amounted to £211,017. The subscriptions received from Indians amounted to £3,329.

Owing to the recall of Indian Medical Service officers to military duty, only five appointments outside the presidency town were held by officers of that service, all other appointments being held by civil Assistant Surgeons.

II.—State-Special, Railway and Private non-aided Civil Hospitals and Dispensaries.

133. The two following statements show the number of these institutions open, and give details of the work done by them in each province of India.

State-Special and Railway Hospitals.

Province.		Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Delhi	1914	8	1,497	26,926	28,423	754
	1913	6	1,412	16,304	17,716	444
Bengal (excluding Calcutta)	1914	96	16,516	334,271	350,787	7,681
	1913	85	14,651	284,230	298,881	6,177
Calcutta	1914	2	3,334	6,191	9,525	238
	1913	2	3,166	4,814	7,980	221
Assam	1914	43	3,277	64,744	68,021	921
	1913	49	3,785	75,235	79,020	787
Bihar and Orissa	1914	75	6,402	194,909	201,311	5,804
	1913	77	5,295	181,328	186,623	5,410
Central Provinces	1914	56	3,896	161,234	165,130	2,652
	1913	63	3,259	143,162	146,421	2,464
United Provinces	1914	129	18,848	310,903	329,751	76,476
	1913	128	18,201	278,826	297,027	6,001
Punjab	1914	157	7,988	553,399	561,387	18,820
	1913	157	7,280	492,877	500,157	17,497
North-West Frontier Province	1914	27	9,649	120,005	129,654	3,315
	1913	27	8,777	111,030	119,807	3,313
Baluchistan	1914	5	1,984	44,852	46,836	953
	1913	8	1,736	52,299	54,095	1,132
Burma	1914	72	17,157	233,690	250,847	2,606
	1913	74	15,512	214,081	229,593	1,380
Bombay	1914	74	5,170	244,896	250,056	6,436
	1913	74	5,175	250,522	255,697	6,582
Madras	1914	103	11,552	269,143	280,695	5,970
	1913	101	9,862	227,261	237,123	5,176
Total ..	1914	847	107,270	2,565,163	2,672,433	63,626
	1913	851	98,171	2,331,969	2,430,140	56,594

Private, non-aided Institutions.

Province.		Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta) ...	1914	139	6,033	1,155,805	1,161,838	24,973
	1913	132	5,620	1,021,802	1,027,422	23,614
Calcutta	1914	3	583	30,414	30,997	2,238
	1913	2/	...	4,570	4,570	224
Assam	1914	6	75	24,224	24,299	381
	1913	13	73	49,433	49,506	610
Bihar and Orissa	1914	65	8,426	687,955	696,381	22,954
	1913	65	8,292	722,765	731,057	21,064
Central Provinces	1914	38	1,679	145,563	147,242	2,560
	1913	36	1,318	139,648	140,966	2,522
United Provinces	1914	49	7,386	387,435	394,821	9,937
	1913	49	7,796	353,118	360,914	9,285
Punjab	1914	13	4,781	84,577	89,358	3,550
	1913	13	4,445	78,868	83,313	3,346
North-West Frontier Province ...	1914	7	2,715	159,324	162,039	9,822
	1913	7	2,201	72,229	74,430	10,593
Baluchistan	1914	2	79	22,571	22,650	277
	1913	2	104	25,647	26,751	436
Burma	1914	...	...	...	...	...
	1913	1	151	560	711	...
Bombay	1914	333	29,430	2,016,768	2,046,198	62,781
	1913	323	16,469	2,026,343	2,042,812	63,800
Madras	1914	55	12,272	321,179	333,451	14,261
	1913	54	10,783	332,374	343,157	15,145
Total	1914	710	73,459	5,035,815	5,109,274	153,734
	1913	697	57,252	4,828,357	4,885,609	150,636

(*III*)—*Lunatic Asylums.*

134. Below are tabulated the number of lunatic asylums in each province during 1914, the total population of such institutions in each province, and the numbers that were discharged as cured and that died, and compares the totals for all India under these heads with the figures of the previous year.

The total number of asylums in India remained the same as in 1913, *viz.*, 21, but there was a slight decline, from 8,472 to 8,452, in the total population. The

total discharged as cured rose from 754 to 832, and the number of deaths declined from 673 to 625.

Province.		Number of Asylums.	Admitted and re-admitted during year.	Total Asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Criminal lunatics.
				Males.	Females.	Total.					
Bengal		3	197	1,039	225	1,264	74	98	1,068·76	107·10	607
Assam		1	100	294	66	360	44	17	281·15	51·56	104
Bihar and Orissa		1	96	320	57	377	25	40	288·57	23·96	160
United Provinces		3	396	1,316	358	1,674	153	139	1,311·74	166·17	320
Punjab		1	264	775	216	991	133	79	735·92	69·22	192
Central Provinces		1	120	339	91	430	35	21	342·35	7·63	92
Bombay		6	486	1,258	317	1,575	220	92	1,112·3	30·4	229
Madras		3	270	801	264	1,065	84	111	811·64	89·95	236
Burma		2	154	575	141	716	64	35	575·78	112·28	303
Total ...	1914	21	2,083	6,717	1,735	8,452	832	625	6,528·21	658·27	2,243
	1913	21	2,327	6,731	1,741	8,472	754	673	6,612·75	614·14	2,210

Bengal.

135. The number of admissions decreased by 16, and although the year was a healthy one, the number of deaths was only two less than in 1913 which was an unhealthy year. There was overcrowding again, especially at the Berhampore Asylum, more particularly on the male side. A scheme for providing more accommodation at this asylum was under consideration.

Assam.

136. The total population rose from 303 to 360, but the number of deaths was 6 less than in 1913, *viz.*, 17 against 23. There was no overcrowding.

Bihar and Orissa.

137. During the year work was begun on an additional female ward with 10 cells and a male ward with 40 beds, on completion of which the capacity of this asylum will be increased to 356.

United Provinces.

138. The total population was 1,674, or an increase of 61 over the previous year. There were 35 more deaths than in 1913, the death rates being 8·20 and 10·47 per cent, respectively. At the close of the year there were 27 male and 24 female European lunatics under constraint.

Punjab.

139. The total population amounted to 991, or an increase of 32 over 1913. A noteworthy feature is the continued and steady increase in the number of females admitted into the Asylum. During the year a quarantine enclosure containing a block of 20 cubicles was added, and a long-felt want for the segregation of new arrivals thus supplied. The accommodation at the asylum is ample for present needs, and the health of the inmates was satisfactory.

140. Admissions show a steady tendency to increase, a fact which would appear to indicate increasing public confidence in the institution at Nagpur. Thus there were 29 more admissions than in 1913. The total population increased from 371 to 430; but it is satisfactory to note that the death rate declined from 67 to 61 per mille. The necessity for the appointment of an expert alienist as whole-time superintendent is receiving attention.

Central Provinces.

141. The total population shows an increase of 125 as compared with the previous year. The number of deaths fell from 106 to 92. The new asylum at Yeravda stands in urgent need of accommodation for insane lepers, padded and strong rooms, new criminal section, etc.

Bombay.

142. There was a slight fall in the total population, which was 1,065 in 1914 as compared with 1,078 in the previous year. The number of deaths was 111, or 10·42 per cent. of the total population, a slight decrease from 1913. Proposals for the construction of a steam laundry and a steam kitchen at the Madras Asylum, as also for providing additional hospital accommodation and a separate kitchen for Brahman patients, are under consideration. There was no overcrowding.

Madras.

143. The accommodation is sufficient and there was no overcrowding. The accommodation for the European and female sections at the Rangoon Asylum is unsatisfactory, but this defect will be remedied when the asylum is transferred to the new site acquired at Kokkaing. There has been a remarkable fall in the mortality rate at the Rangoon Asylum, which was 31·19 per cent. in 1912, 19·95 in 1913, and 7·20 in 1914.

Burma.

IV.—Medical Colleges.

144. *Grant Medical College.*—There were 589 male and 42 female students on the rolls of the college; total 631. The following statement shows the number of candidates that presented themselves for the various examinations and the number that passed.

Bombay.

Examinations.	Number of Candidates.	Passed.	
		Males.	Females.
L. M. & S.			
Part I	78	49	0
Part II	90	61	0
M. B., B. S.			
Preliminary	178	97	12
Intermediate	232	76	3
Final { Part I	83	50	0
Final { Part II	92	38	0
M. D.			
Branch I, Medicine	3	3	0
Branch II, Midwifery	2	2	0
BACHELOR OF HYGIENE.			
Part I	2	0	0
Part II	3	2	0

There were 29 military medical pupils under training as military Assistant Surgeons, 12 of whom passed out and left the college during the year.

145. *Madras Medical College.*—There were four hundred and nineteen students on the rolls of the college distributed as follows :— Madras.

Class.	Males.	Females.	Total.
M. B. & B. S.	158	10	168
L. M. & S.	97	2	99
B. S. SC.	2	0	2
Additional Course	32	3	35
Apothecary Diploma	0	18	18
Military Pupils	25	0	25
Chemists and Druggists	14	0	14
Sanitary Inspectors	58	0	58
Total ...	386	33	419

The following table details the number of students who sat for the University examinations and the number that passed.

Examination.	Number of candidates.	Passed.
L. M. & S. (*old*).		
1st Examination	2	0
2nd Examination	6	6
L. M. S. (*new*).		
2nd Examination	39	25
3rd Examination	41	32
Final Examination	82	41
M. B. & B. S.—		
1st Examination	69	29
2nd Examination	37	24
3rd Examination	41	22
Final Examination	43	13
Total ...	360	192

Four female students appeared for the 1st M. B., of whom two passed, and one each appeared for the 3rd L. M. & S. and final M. B. and both passed. Three appeared for the final examination for the Apothecary Diploma and passed.

Of the 25 military pupils, 9 passed out of the college and were appointed military Assistant Surgeons.

146. *Lahore Medical College.*—The total number of students on the rolls of the college was 172 as follows :—

Punjab.

(*i*) Government scholarship holders:—

Punjab	22
North-West Frontier Province	3
Native States and Dufferin Fund	8
(*ii*) Private students from various provinces	139
Total ...	172

The following statement gives the number of students that appeared for the University examinations and the number that passed :—

Examination.	Candidates.	Passed.
Final L. M. & S. (*old*)	3	2
1st M. B., B. S.	32	27
2nd M. B., B. S.	33	29
Final M. B., B. S.	34	8
Total ...	102	66

Two female students appeared for the final examination for the College L. P. M. S. certificate and both passed. Nineteen students appeared for examination for the Midwifery Diploma of the Medical College and 13 passed. Forty-one candidates presented themselves for the examination for the *Dhai's* certificate of the college, and 37 secured a pass.

A Professor of Operative Surgery and three Demonstrators of Anatomy and Physiology were added to the staff of the college. In October 1914 work was begun on the Medical College extensions under the King Edward memorial scheme, and it is anticipated that all the new college buildings will be completed within two years time.

147. *The Calcutta Medical College.*—During the year there were 851 male, 24 female and 105 military students on the rolls of the college, or a total of 980 students. Applications for admission to the college numbered 702 as compared with 581 in the previous year; 154 of the former were admitted. The following statement shows the

Bengal.

number of students who appeared for the University examinations, and the number that passed :—

Examination.	Number of candidates.		Passed.	
	Males.	Females.	Males.	Females.
Preliminary Scientific M. B.	182	6	125	3
First M. B.	244	7	90	5
Second M. B.	109	3	59	2
Total ...	533	16	274	10

One student in the female certificate class passed the Final Diploma examination. Only two students of this class remain, and no more will be admitted in the future. Forty-four military pupils appeared for the final examination, of whom 35 passed and left the college on being appointed as military Assistant Surgeons.

148. *King George's Medical College, Lucknow.*—There were 109 students on the rolls of the college; 104 males and 5 females.

United Provinces.

The following statement shows the number of students who appeared for the different examinations and the number that passed :—

Examination.	Candidates.		Passed.	
	Males.	Females.	Males.	Females.
First M. B., B. S.	37	2	31	2
Final M. B., B. S. (Group A.)	19	...	16	...
Female Certificate Class 2nd Examination	...	1	...	1
Total ...	56	3	47	3

A hostel for lady students was completed during the year.

V.—Medical Schools.

There are 15 medical schools distributed as follows :—Bengal 2; Madras 3; Bombay 3; United Provinces 1; Punjab 2; Burma 1; Bihar and Orissa 2; and Assam 1.

149. *The Campbell Medical School, Calcutta.*—During the year there was a total of 382 students on the school rolls, 366 of whom were males, and 16 females.

Bengal.

The following table gives the number of students who appeared for examination.

Examination.	Students.		Passed.	
	Males.	Females.	Males.	Females.
Licensed Medical Practitioners Diploma (old Sub-Assistant Surgeon class.)—				
Junior Examination	96	4	52	1
Final Examination	84	2	52	1
Compoundership	100	1	90	1

The school is in urgent need of hostel accommodation for students. Passed students of the school were employed in the Campbell Hospital during the year as House Surgeons and Physicians and as Obstretric Assistants with satisfactory results.

The Dacca Medical School.—There were 269 male and 5 female students on the rolls of the school; total 274. The following statement details the result of the school examinations :—

Examination.	Candidates.		Passed.	
	Males.	Females.	Males.	Females.
Licensed Medical Practitioners Diploma—				
Junior Examination	54	1	38	1
Final Examination	51	2	40	2
Compoundership	109	...	94	...

The school accommodation is stated to be very inadequate, and there is also urgent need for hostel accommodation.

150. *Medical School, Royapuram.*—At the beginning of the year there were 210 male and 24 female students, and 37 military pupils on the rolls of the school, or a total of 271. Seventy-seven students presented themselves for the 1st year examination of whom 46 were successful ; 57 appeared for the 2nd year examination and 46 passed ; 54 for the 3rd year examination and 53 passed ; and 76 appeared for the final, or 4th year examination, 71 of whom passed. A scheme for additional hostel accommodation for male students to the extent of 200 more rooms is under consideration.

Madras.

Prince of Wales' Medical School, Tanjore.—The school opened with 122 pupils on its rolls. Nineteen final year, 25 third year, 34 second year and 24 first year pupils appeared for examination, of whom 16, 25, 29 and 19, respectively, passed. The school is urgently in need of more accommodation and more equipment, and also of a hostel for students.

Medical School, Vizagapatam.—There were 98 students on the school rolls. Twenty-one final year, 24 third year, 20 second year and 26 first year students were examined, of whom 21, 24, 18 and 16, respectively, passed.

Bombay.

151. *Medical School, Hyderabad (Sind).*—There were 86 students on the rolls at the beginning of the school year, and 96 at the end of the year. Of the latter, 8 were civil medical pupils, 30 stipendary and 58 paying pupils. There were 11 candidates (7 stipendary and 4 paying pupils) for the final examination and all passed. The school was closed for a month during the year on account of plague.

The Byramjee Jeejeebhoy School, Poona.—The school year opened with 143 students on the rolls and closed with 145. During the year, 21 pupils passed out from the school as Sub-Assistant Surgeons, 12 of whom were admitted into the civil, and 3 into the military branch of Government service.

The Byramjee Jeejeebhoy School, Ahmedabad.—The school opened with 171 students on the rolls, of whom 60 were military and the remainder civil pupils. During the year, 31 pupils (4 military and 27 civil) passed out of the school as Sub-Assistant Surgeons; 6 were dismissed or removed, and 51 new students admitted, so that the year closed with 185 students on the rolls. A full-time lecturer in Anatomy and Physiology was added to the staff of the school.

United Provinces.

152. *Medical School, Agra.*—During the year there were 198 male and 61 female students in the school; total 259 students, classified as follows:—military class 74, civil class 90, Rajputana class 9, private class 18, and compounder class 7. Forty-eight male and 9 female students presented themselves for the final examination, of whom 47 and 9, respectively, passed, and one female student appeared for and passed the compoundership examination. Of the 47 successful male candidates, 12 belonged to the military class.

Punjab.

153. *Medical School, Lahore.*—The year opened with 352 students on the rolls of the school, but in consequence of some military pupils leaving the school and the names of 90 being removed from the rolls for going on strike, the year closed with only 258 students on the rolls.

Seventy-eight students appeared for the final, and 95 for the junior examination for the Sub-Assistant Surgeon's Diploma, of whom 73 and 73, respectively, passed.

Women's Christian Medical College, Ludhiana.—This is now the provincial school for training women as Sub-Assistant Surgeons. Three students appeared for the final, and five for the junior examination: all three of the former passed, and three of the latter.

Burma.

154. *Burma Government Medical School, Rangoon.*—During the year there were 61 students on the rolls of the school. Nine male students, of whom 3 were Burmese, one Chinese and 5 Indians, appeared for the final examination for Sub-Assistant Surgeons, and all were successful.

155. *Temple Medical School, Patna.*—During the year there were 90 students on the rolls, 88 male and 2 female as compared with 94 and 2, respectively, in 1913-14. Out of 20 students of the 4th year class who appeared for the final examination, 18 passed: three 4th year students who were referred back for three months in one subject were re-examined in July 1914 and passed. Two passed students were recruited into Government service as permanent Sub-Assistant Surgeons and three students were recruited as temporary Sub-Assistant Surgeons.

Bihar and Orissa.

In the compounder class there were 54 students during the year: 22 appeared for the examination of whom 17 passed. There were two female students in this class but both left the school during the session.

Orissa Medical School, Cuttack.—At the close of the year there were 103 male and 5 female students as compared with 85 and 6, respectively, in 1913-14. In the final examination 23 male and 2 female students passed. Eight passed students were recruited into Government service during the year.

There were 80 students of the compounder class under training during the year of whom 30 passed the prescribed examination.

156. *The Berry White Medical School, Dibrugarh.*—At the close of the year there were 130 students on the rolls as compared with 112 at the end of the previous year. Out of 20 students of the 4th year class, 14 passed the final examination.

Assam.

There were 38 students of the compounder class under training during the year, of whom 20 passed the prescribed examination.

VI.—The X-Ray Institute of India, Dehra Dun.

157. One class of instruction was held during the year. The usual autumn class was not held owing to the demands on the Military Department for mobilisation. The total number of students attending was 20. Of this number 19 passed the prescribed examination, 7 obtaining special proficiency certificates, and one failed to pass. The students included officers of both services in military employ, Assistant Surgeons and Sub-Assistant Surgeons (civil and military). There were also two private students sent from the Mysore State.

The number of radiographic examinations made during the year was 926, and 85 cases of disease were under treatment.

Seven Military Divisional sets of apparatus have been supplied for field service.

The Branch Installations at Delhi and Simla are both in working order and are obtaining a large number of patients.

A scheme for enlarging the Institute and adding a Radium Department was prepared, but its consideration had to be deferred on account of the war.

No case of X-Ray traumatism has occurred to any of the staff, students or patients of the Institute.

SECTION VIII.

GENERAL REMARKS.

181. *The Central Research Institute*:—The usual four bacteriological classes were held in the summer months at which twenty-two gazetted officers and nine military assistant surgeons underwent a course of instruction in bacteriological technique. In addition the usual spring malaria class at which there was an attendance of thirty-three was held in Delhi. Owing to the war the customary autumn class was in abeyance.

Laboratories.

The serum and vaccine section was fully employed. Anti-typhoid and anti-cholera vaccine and anti-venomous and anti-dephtheritic sera were made and supplied in large amounts. Over 82,000 doses of anti-typhoid vaccine were turned out as compared with a normal output of about twenty thousand doses. The abnormal demand was chiefly occasioned by the requirements of the military authorities for the use of Indian troops on active service. Eighty-three autogenous vaccines were prepared.

The examination of pathological and entomological specimens is an important branch of the Institute's activities. During the year under report 1,857 such specimens were examined and reported on.

The eleven reports on researches carried out by officers working at the laboratory that were published during the year in the pages of the *Indian Journal of Medical Research* are evidence that the Central Research Institute is worthily fulfilling its chief function.

The Central Malaria Bureau is now one of the most important sections of the Institute. It carried out several important investigations. Three of these may be referred to :—

(1) An inquiry into conditions relating to the effects of canal irrigation in Delhi.

(2) An investigation of a recently reported supposed new species of malaria parasite in the Central Provinces. The new parasite, if it be such, is of extreme rarity and of no immediate practical importance in the locality from which it has been described.

(3) An inquiry into the measures that should be adopted with regard to the prevalence of *Stegomyia* mosquitos in Calcutta.

Important additions have been made to the collection of mosquitos maintained in the Bureau. Many medical officers avail themselves of the services of the Bureau with regard to the identification of specimens of mosquitos and sandflies.

An entomological section of the Institute was started during the year and did good work.

The Bombay Bacteriological Laboratory.—This Institute still continues to function as a Plague Laboratory for India as well as the Bombay provincial laboratory.

The output of anti-plague vaccine was larger in 1914 than in any previous year with the single exception of 1911. Altogether 812,942 doses were despatched. An increased demand for vaccine was made from all parts of India except the Bombay and Madras presidencies. Since the laboratory was opened in 1896 twelve and a quarter million doses of anti-plague vaccine have been supplied. The annual report

Rs. 50,99,683 of the previous year: a large proportion of the increase was derived from municipal rates and taxes. Of the total receipts, 40·15 per cent. was spent on sanitary works, original and recurring; 7·36 per cent. on roads; 4·58 per cent. on public safety and 26·40 per cent. on other requirements. The corresponding percentages in the previous year were 32·21, 6·51, 3·73 and 37·82, respectively. The total municipal expenditure on sanitation amounted to Rs. 42,11,499, compared with Rs. 36,09,497 in 1912-13. The increase was due chiefly to expenditure under water supply, drainage and conservancy and indicates that the sanitary needs of towns are receiving increased attention.

The total cost of sanitary works carried out during the year by Government, municipalities, district boards and private individuals, amounted to Rs. 17,28,946, showing an increase on the expenditure of Rs. 13,14,368 in the previous year. The largest item was Rs. 6,92,040, spent on the Howrah water works and the next, Rs. 1,22,200, on the water works of the Hooghly-Chinsurah Municipality. The largest item of expenditure on drainage was Rs. 52,928 in Burdwan.

From the balance of the non-recurring sanitary grant of 20 lakhs made by the Government of India in 1913, and from other non-recurring grants for sanitation, allotments were made to 29 different schemes. The largest grant was of one lakh for the Narainganj water supply; the grant for the Hooghly-Chinsurah water works amounted to Rs. 50,000, Uttarpara water supply (Rs. 44,815), improvement of Berhampore water works (Rs. 40,000), and English Bazar water supply (Rs. 40,000). From the recurring grants of 9½ lakhs for 1914-15, grants were made for eleven purposes, including Rs. 47,275 for experiments on Calcutta sewage and Rs. 42,017 for the drainage of the Calcutta fringe area.

The septic tank installations at the various mills on the banks of the Hooghly continued to give every satisfaction and have entirely revolutionized sanitary arrangements in the mills. Several new installations have been constructed and old ones remodelled.

The Patna system of improving village sanitation was carried out in six districts and consisted chiefly of clearing roads, baling out impure water from tanks used for drinking and domestic purposes, clearing jungle, cutting and clearing drains, filling up ditches and removing refuse. In connexion with the sanitation of rural areas, the local Government draws attention to the value of private effort and to the enormous amount of good which can be done by private individuals working in small areas and directing private and public expenditure in an orderly and sensible fashion.

The Sanitary Engineer's Department, which had in the previous year been separated and is no longer under the control of the Sanitary Board, was strengthened and other changes were effected which assisted the progress of work.

Sketch projects for water supply for 11 places were in course of preparation. The larger of these were for (1) the Garden-Reach extension (cost Rs. 3,40,000), Comilla (Rs. 2,19,000), Raniganj (Rs. 1,81,000), Ranaghat (Rs. 1,44,000), and Pabna (Rs. 1,65,000, with provision for extension to cost an additional sum of Rs. 81,000). Detailed schemes were prepared for four municipalities and seven schemes were under construction: of the latter, the Jessore, Hooghly-Chinsurah, Serampore-Khulna and Kalimpong schemes were completed before the close of the year. As to sewerage schemes, that for Cossipur-Chitpur was submitted for administrative approval; the initial scheme for Dacca, to cost Rs. 8,58,000, was also submitted to Government, and a sketch project for a combined sewerage and surface water drainage for Serampore, estimated to cost Rs. 3,18,000, was drawn up. Surface

drainage schemes were under preparation for 12 places and detailed projects prepared for four others. Of drainage schemes under construction, those for Ranaghat, Berhampore, Uttarpara and Bankura were completed.

The Calcutta experimental sewage installation was completed and handed over to the provincial Sanitary Commissioner. Estimates for two anti-malarial schemes, one for the Singram Colliery near Raniganj and the other for the Meenglas Tea Estate, were prepared on the principle of underdraining which has been successfully adopted in the Malay States.

Sanitary Board.

161. There was no change in the constitution of the Board during the year, which was composed of four official and three non-official members. Nine meetings were held during the year. Nine sketch projects of the estimated cost of Rs. 53,21,672 were recommended to Government for administrative approval, and 14 detailed schemes were forwarded and recommended for final sanction, their estimated cost amounting to Rs. 12,65,625. The Board recommended that financial authority should be delegated to it, but this was not accepted by the local Government.

Assam.

162. As in 1914, there were in Assam during the year under report, 14 municipalities, 4 unions and 1 station, and their total income amounted to Rs. 8,56,613, against Rs. 6,66,390 in 1913. The increase of Rs. 1,90,223 is explained by Government grants-in-aid for the construction of water works and other schemes. On sanitation the expenditure was Rs. 3,70,076, an increase of Rs. 65,307 on that in 1913. The percentage of income expended on sanitation proper fell to 28·58 from 35·7 in the preceding year : the Karimganj municipality spent 79·68 per cent. of its income on sanitation, three municipalities spent between 50 and 60 per cent., one 40 per cent., six between 30 and 40 per cent., two between 20 and 30 per cent. and six below 20 per cent. It is pointed out that the heading "conservancy" includes road watering and cleansing, and therefore does not show clearly what is spent on conservancy proper. The question is to receive the attention of the local administration.

Considerable advance was made during the year towards providing the larger towns with pipe water supplies, and the hitherto primitive and inefficient conservancy arrangements were remodelled and expanded, these improvements being aided by help from Government. From 1911-12 to 1914-15, the Imperial Sanitary grants, recurring and non-recurring, amounted to Rs. 7,96,000 of which Rs. 7,28,000 was allotted. During 1914-15 the allotments for water supply, drainage, conservancy and miscellaneous purposes amounted to Rs. 2,77,751, the two largest grants being of Rs. 1,10,000 and Rs. 66,666, for the improvement of the Sylhet and Tezpur water supplies, respectively.

Of the larger works mention may be made of (1) the Silchar water works, estimated cost Rs. 1,32,768, on which work is to be started at once; (2) the Sylhet water supply scheme to cost Rs. 2,00,882 ; (3) the Tezpur water supply project to cost Rs. 99,998, on which work is to commence shortly; (4) water supply project for Dhubri to cost Rs. 58,065 ; (5) water supply of Dibrugarh to cost Rs. 1,66,000, and drainage scheme Rs. 76,606 : the two last named are under the consideration of Government. A scheme to drain the town of Nowgong is under investigation. The drainage scheme of Goalpara has been postponed pending the consideration of the question of improvements to the water supply and conservancy

which appear more pressing, while the sewerage scheme for Shillong has not progressed owing to the absence of funds. A small pipe water supply scheme was satisfactorily completed for two villages in the Khasi and Jaintia Hills, and furnishes an example of what can be done under favourable conditions at a comparatively low cost. The water works for Jorhat town were practically completed but not expected to be available for use till the tank from which the supply is to be derived is filled by the rains.

The matter of rural water supply received attention and comprehensive schemes for improvement have been evolved by each of the 19 Local Boards in the province.

A scheme for a service of District Sanitary Inspectors was drawn up, but its further consideration has been postponed.

The expenditure of Local Boards on sanitation increased to Rs. 2,24,388, from Rs. 89,397 in the preceding year. This large increase is accounted for by the increased activity displayed by Local Boards in the improvement of water supply as the result of the Government grant of Rs. 10,000 to each in 1913-14.

Sanitary Board.

163. There was no change in the constitution of the Board during the year. Only one meeting was held, business being conducted by the circulation of papers.

The more important schemes considered by the Board, and submitted to Government with recommendations, related to eight water supply projects, the five years' programme of rural water supply and the Golaghat drainage scheme. Two water supply and four drainage schemes, one town improvement project and an anti-malaria scheme were under consideration at the end of the year.

The functions of the Board were purely advisory: no funds were placed at its disposal and no independent action initiated.

Bihar and Orissa.

164. During the year 1913-14, municipalities in the province spent Rs. 14,48,054 on sanitary purposes against an expenditure of Rs. 8,68,190 in the previous year. The most noteworthy increases were under conservancy (Rs. 73,640), drainage (Rs. 2,18,977) and water supply (Rs. 2,99,678): the increased expenditure on drainage was largely accounted for by a sum of Rs. 1,25,669 spent on the Gaya drain flushing scheme. The largest expenditures on water supplies were incurred at Gaya and Monghyr.

The expenditure by District Boards on sanitation amounted to Rs. 2,45,803, against Rs. 1,83,381 in 1912-13: increased expenditure was incurred under all the main heads.

Of the Imperial grant for sanitation, Rs. 8,43,261 was allotted: the largest grant was one of Rs. 3,75,615, a contribution to the Jherria water supply scheme. A sum of Rs. 1,50,000 was allotted for the Gaya improvement scheme and Rs. 1,28,000 for sanitary improvements in certain villages in the Patna district.

In addition to the two first class Health Officers of Patna and Gaya, a third has been appointed to Puri. Four second class Health Officers were sent for training to the King George's Medical College at Lucknow and seven others are to be sent to Madras. Sanitary Inspectors are trained in the province at Bankipore, and 12 of the 21 students admitted have qualified.

Sanitary Board.

165. Sketch projects were prepared for six large water supplies. The scheme for Cuttack is estimated to cost Rs. 5,00,000; that for Bettiah, Rs. 3,25,000, and for Chapra, Rs. 3,00,000. Sketch projects were also prepared for seven minor water supplies. Detailed

schemes were worked out for six other water-supplies: those for Patna and Bankipore are to cost Rs. 13,50,000 and Rs. 7,33,768, respectively. The water-supply projects for Daltonganj, Arrah and Muzaffarpur were under construction.

Of sewerage schemes, that for Muzaffarpur, to cost Rs. 4,62,500, received the administrative approval of Government, that for Gaya, to cost Rs. 6,80,000, was under construction—a project to cost Rs. 3,85,000 was prepared for Bankipore. Several schemes for surface drainage were proposed, sketch projects being in hand for eleven places and detailed projects prepared for five. The Monghyr drainage scheme to cost Rs. 2,22,000 is nearly completed. The total cost of water works and drainage projects for the province amounted to Rs. 83,63,284.

United Provinces.

166. In 1913-14 the municipal income was Rs. 99,98,464, compared with Rs. 88,85,859 in the previous year. The expenditure on water-supply and drainage was Rs. 14,35,495 and Rs. 7,95,368, showing decreases of Rs. 1,92,697 and Rs. 31,593, respectively, on the expenditure of the previous year: the expenditure on conservancy rose from Rs. 15,29,969 to Rs. 16,10,139. The total expenditure on these items was Rs. 38,41,002 against Rs. 39,85,122 in 1912-13, which represents 38 per cent. of the total municipal income, against 45 per cent. in the previous year.

Of the Government of India grant for urban sanitation, Rs. 8½ lakhs was allotted during the year. The largest allotment was one of two lakhs for the Agra water works, followed by allotments of one-and-half lakhs for the Fyzabad water-supply, one lakh for the Allahabad drainage scheme, Rs. 75,000 for the Benares drainage works, and Rs. 73,000 for the Cawnpore water works; in addition there were four allotments of Rs. 50,000 each and one each of Rs. 30,000, 12,000 and 10,000. Of the recurring grant of five lakhs made by the Government of India, Rs. 3,92,018 was distributed. Among the allotments were Rs. 50,000 for rural sanitation, Rs. 34,000 for inquiries into the cause of the prevalence of malaria, Rs. 25,000 for the free distribution of quinine and Rs. 10,000 for dealing with outbreaks of cholera.

Final sanction or approval was accorded to 16 water works or drainage schemes, the largest of which was the Muttra water-supply scheme (cost Rs. 3,98,100), the experimental sullage farm at Lucknow (cost Rs. 1,57,483), and the Ballia drainage scheme (cost Rs. 89,880).

During the year a certain amount of construction work was taken up by the Sanitary Engineer's staff: this is a move in the right direction, as it gives the men a greater interest in their work and enlarges their experience. It is hoped that in time all the more important sanitary works will be carried out by the Sanitary Engineer's staff.

Sanitary Board.

167. The Sanitary Board held seven meetings during the year. Projects for sanitary works, the cost of which aggregated Rs. 13,65,286, were considered by the Board and were either administratively sanctioned or approved. Of these five were for water-supplies, eleven for drainage and three for other works. In addition schemes for opening out congested areas, town planning and for other sanitary works were approved.

Punjab.

168. Continued activity was shown in the direction of sanitary reform. The system of rewards for sanitation does not appear to appeal to those concerned, as no village community in the three districts in which rewards were offered made any effort to earn them. In the

principal towns, 1,748 acres of land were under sewerage irrigation, and realized Rs. 33,489, showing increases of 229 acres in area and of Rs. 6,968 in income, compared with the preceding year.

The most important sanitary work in the province was the Chair water-supply extension for Simla. The work was completed at a total cost of Rs. 5,66,683 and handed over to the municipality. The underground sewerage for part of Amritsar made excellent progress during the year: the scheme is estimated to cost Rs. 2,36,008. The Amritsar city sewage disposal works, completed in 1912, are proving very profitable to the municipality, the income from the use of irrigation water being Rs. 20,000 against an expenditure of Rs. 7,500. The filling of "*dhabs*" round Amritsar city, to cost 1½ lakhs, is approaching completion, and the scheme for clearing, regrading and lining the storm channels round the city, roughly estimated to cost Rs. 3,59,300, has been submitted to Government as an anti-malarial measure. The preparation of the detailed project for an underground water-borne sewerage system for Lahore made satisfactory progress. This scheme was administratively sanctioned in 1913 for 15½ lakhs, towards which the local Government has sanctioned a grant-in-aid of 9 lakhs. The water works for Sialkot, commenced in 1913, are expected to be completed shortly. The intra-mural drainage scheme of Rawalpindi was completed at a cost of Rs. 1,71,430 and another estimate for subsidiary drainage works is under preparation. To meet the demand for water at Lyallpur, a scheme for extension of the water-supply, to cost Rs. 1,14,608, has been sanctioned: in anticipation of the detailed project, a new pumping plant is to be installed and two new filters built. At Gujranwala a rough water-supply project, cost Rs. 5,04,918, has been prepared and is under consideration. Proposals for drainage works and an estimate for filling depressions round the town are in hand. The Multan water-supply scheme, to cost Rs. 3,52,173, has been sanctioned, while the city intra-mural and suburban drainage scheme, amounting to Rs. 3,82,565, is under the consideration of the municipality. For Dera Ghazi Khan a detailed estimate for Rs. 1,71,520 for an extension of the water-supply has been sanctioned and a rough drainage project amounting to Rs. 4,13,982, prepared.

The Sanitary Engineer's office prepared or recast 16 detailed estimates of a total value of Rs. 14,11,654, while 24 rough and detailed estimates of the value of Rs. 27,51,900 were prepared for administrative sanction. The estimates scrutinized and finally approved by the Sanitary Engineer numbered 29 representing an expenditure of Rs. 9,95,604. The local Government sanctioned 11 estimates aggregating Rs. 8,15,805 and one revised estimate for Rs. 43,382.

Sanitary Board.

169. The Sanitary Board met five times during the year. In order to provide funds for a large number of sanitary schemes pending with the Board, the local Government sanctioned an additional grant of Rs. 50,000. In the first three months of 1914 practically the whole amount was distributed.

During the year the annual grant of Rs. 1,50,000 was increased to Rs. 7,50,000. Circumstances, however, necessitated the withdrawal of Rs. 3,75,000 of the grant, which could otherwise have been spent. Of the urban grant of three lakhs placed at the disposal of the Board in 1914-15, grants aggregating Rs. 2,17,791 have now been allotted, leaving a balance of Rs. 82,209, while of the grant of two and-a-half lakhs for rural sanitation, a balance of Rs. 2,40,436 remains unexpended. In addition to grants made by the Board, Government grants amounting to Rs. 3,11,859 were made to various schemes: the two largest of these were

of one lakh and one lakh and-a-half, respectively, to the Multan drainage and water works schemes.

The Board submitted 14 schemes to Government and administrative sanction was accorded to all. The more important were the Rewari water-supply scheme, to cost Rs. 2,42,407, Dera Ghazi Khan water-supply scheme, Rs. 1,49,158, and the Lyallpur water extension, Rs. 1,14,608. Technical sanction was accorded to 9 schemes which had previously been approved by the Board.

The demands made on the Sanitary Board have steadily increased in number and importance; Government recognition of this fact is evidenced by the substantial increase of the allotment placed at the Board's disposal, and the extension of its functions. The Board is now authorised to accord administrative sanction to all sanitary schemes not exceeding one lakh, and also to allot grants-in-aid to schemes of rural sanitation without reference to Government. It has been ruled that grants-in-aid to municipalities and district boards may be made irrespective of the agency by which the work is to be done.

North-West Frontier Province.

170. The larger sanitary schemes for which grants have been made have not yet been commenced, chiefly owing to want of staff. Sanction has been accorded to a private sanitary engineering firm drawing up a drainage improvement scheme for Peshawar.

The recurring grant of one lakh for sanitation was duly distributed, chiefly to augment previous grants for schemes in connexion with water-supply.

Central Provinces and Berar.

171. The total income of municipalities for 1913-14, excluding loans and balances, was Rs. 31,62,928 against Rs. 32,26,353 in 1912-13, of which 42 per cent., or Rs. 15,42,308, was spent on sanitation. The expenditure on water-supplies amounted to Rs. 3,72,627, on drainage to Rs. 4,10,123, and on conservancy to Rs. 5,89,058.

Provincial grants for water-supply, drainage, opening up of congested areas and miscellaneous improvements amounted to Rs. 4,24,832.

The year was one of increased sanitary activity in most municipal towns: the adoption of standard designs and the drawing up of definite sanitary programmes are producing good results. The opening up of crowded areas, introduction of building rules, construction of market stalls, public latrines and protected wells, are all proceeding gradually, the progress being noticeable in some districts.

The following more important water-works schemes were in progress during the year:—Water-supply to Government House, Nagpur, completed, cost Rs. 40,805; Akola water works, estimated cost Rs. 6,55,796; Arvi water works, estimated cost Rs. 4,02,603; Damoh water works, estimated cost Rs. 4,09,356. Schemes have been prepared in connexion with the Amraoti water works, cost Rs. 8,52,761; the Wardha water works, cost Rs. 4,10,667, and the Bilaspur water-supply, cost Rs. 3,21,370. It has, however, been decided not to take up these till the present war is over. Schemes have also been prepared for various other water works, but cannot be undertaken for want of funds.

As regards drainage works, the Wardha scheme was completed at a total cost of Rs. 1,79,983; the Nagpur scheme is progressing satisfactorily and the expenditure so far incurred amounts to Rs. 7,73,903 out of the estimated cost of 16 lakhs; plans and estimates for the Craddock Town drainage, Nagpur, amounting to Rs. 2,10,550, have been sanctioned and work is to begin shortly; the Harda scheme

to cost Rs. 2,13,610, has been sanctioned, and work has commenced. Other schemes are under consideration, including that for Jubbulpore.

Progress is being made in connexion with sanitation in villages. A special grant of Rs. 60,000 was given for the improvement of water-supplies in selected areas, especially at places where fairs are frequent and along the routes leading thereto. For the improvement of ryotwari villages a provincial allotment of Rs. 58,664 was sanctioned against Rs. 67,625 in the previous year; this is mostly spent on water-supplies.

In 1914 there were 85 villages under the Village Sanitation Act: their aggregrate income was Rs. 1,73,406 and the expenditure Rs. 1,54,697 compared with Rs. 1,60,532 and Rs. 1,14,540, respectively, in the previous year. Town fund and other villages had an income of Rs. 64,563 of which only Rs. 3,682 was spent on water-supply. In villages under district councils, Rs. 1,11,209 was spent on tanks and wells.

Sanitary Board.

172. The Sanitary Board held six meetings during the year and considered many schemes in connexion with water-supply, drainage, town improvements, etc.

Madras.

173. The application of the District Municipalities Act to the Tiruvalur Union raised the number of municipal towns in the presidency from 63 to 64. The assignment of these bodies for sanitation was 51·8 per cent. of income compared with 46·6 per cent. in the previous year. Of the total Rs. 4,80,382 was for improvement of water-supply, Rs. 11,72,235 for conservancy and the balance for improvement of drains and other minor sanitary works. In 23 towns the expenditure exceeded 75 per cent. of the allotment.

There was no change in the number of District Boards. Their allotment for sanitation was Rs. 17,92,204 against Rs. 10,84,141 in 1913, and the expenditure in the nine months for which figures are available, was 40·8 per cent. against 51 per cent. in the corresponding period of the previous year.

At the end of the year there were 25 municipal towns with a piped water-supply. Sanction has been accorded to a protected supply for 14 towns, nine of which are under execution. For District Boards pipe water-supplies are not likely in the near future, but much activity was shown in regard to improving and constructing wells of approved design.

Ootacamund remains the only *mofassil* town with a drainage scheme. The provincial Sanitary Commissioner remarks that it is undesirable, in his opinion, to defer all measures for improving existing insanitary conditions because a comprehensive scheme is contemplated or is under investigation; in some cases a slight outlay would do a good deal to prevent serious outbreaks of disease. As a matter of fact drainage schemes are under execution at Madura and Vellore, and under investigation for 28 other towns.

In regard to sewage farming there was no advance on the conditions noticed in the report for 1913. One difficulty is the want of drains to conduct the sullage to selected sites for disposal to irrigate crops.

The subject of the relief of congestion and town planning received attention during the year, but progress is slow. Schemes for several towns are held up, one great obstacle being the need for suitable up-to-date survey maps: efforts are being made to provide these maps and to advise local bodies of the lines on which proposals should be drawn up.

In connexion with sanitary works, the following particulars are taken from the report of the Sanitary Engineer for 1914: the report is now for the calendar year.

Anantapur water supply.—Sanction was accorded to a scheme estimated to cost 2 lakhs. Cuddalore water supply.—Plans and estimates aggregating 7·66 lakhs were prepared but were returned for revision on some minor points. Bellary water supply.—A scheme to cost 11 lakhs has been postponed owing to financial stringency occasioned by the war, but a modified scheme has been submitted for consideration. Ootacamund drainage.—Plans and estimates for improvements to the main sewer, to cost 2·60 lakhs, were prepared but were returned by the Chief Engineer for further tests. Several schemes were under preparation during the year, among them the Tuticorin water supply; Tanjore water works improvements, cost 1·67 lakhs; Palni water supply to cost 3·53 lakhs; Kumbakonam drainage to cost about 6 lakhs: Adoni drainage, cost about 2½ lakhs; Salem drainage, cost about 4 lakhs; Trichinopoly drainage to cost 10½ lakhs; Negapatam drainage, cost 7·30 lakhs. In addition several schemes were under investigation.

In regard to water supply the Sanitary Engineer notes that experiments with the sand and mechanical filter installation at the King Institute at Guindy were continued and valuable information obtained. An interim report was submitted with a recommendation to add a Mather and Platt filter at a cost of Rs. 5,500: sanction to this was duly accorded. In connexion with the improvement of rural water supplies, pumps, galvanised iron tanks and fitter's tools were obtained and distributed to District Boards on requisition. Popular prejudice against covered wells and the use of pumps has been slowly but steadily overcome and the benefits of the improvements are now appreciated.

Sanitary Board.

174. There was no change in the constitution of the Sanitary Board which approved plans and estimates relating to 56 works estimated to cost over 22 lakhs. Of these schemes, 27 to cost 3·13 lakhs, were within the sanctioning power of the Board: 4 of these were completed during the year and 12 others were under execution.

Coorg.

175. During the year 1914, the following sanitary works were carried out in Mercara at a cost of Rs. 12,553:—(*a*) draining the school and *petta* swamps, Rs. 4,594; (*b*) constructing a subsidiary tank below the reservoir, Rs. 3,709; and (*c*) improving the Gowli quarters and swamps, Rs. 4,250. In addition, the piped water supply was extended to Hill Road and the houses on the west of Mercara. Wells were sunk in two *pettas*, and repairs carried out to several tanks in the province.

Bombay.

176. There was no change during the year in the number of city and town municipalities which remained at 158. Excluding Bombay city, the total income amounted to Rs. 1,25,73,669 as compared with Rs. 1,09,75,326 in 1912-13. The expenditure on public health requirements, such as water supply, drainage and conservancy, amounted to Rs. 34,25,979 against Rs. 38,61,355 in the previous year. The total municipal expenditure on public health, including expenditure on water supply, drainage and conservancy, was Rs. 56,61,720, showing a decrease of Rs. 6,37,944, compared with the previous year.

There were 26 District Local Boards and 216 Taluka Local Boards during 1913-14 against 25 and 214, respectively, in 1912-13. Their income amounted to Rs. 83,39,701 and the expenditure to Rs. 78,48,589. Of the expenditure Rs. 3,73,550 was spent on water supplies, drainage and other sanitary improvements.

In addition to the Imperial allotment of Rs. 7 lakhs, the local Government also made certain allotments. The Imperial grant was, as in the previous year, mainly devoted to the improvement of water supplies, village sanitation and the maintenance of dispensaries, roads and bridges: the provincial grant was for improvements to village water supplies exclusively.

A special grant of Rs. 15,000 was made to deal with the scarcity of water in the Sholapur district, and one of Rs. 3,000 for the improvement of the water supply in West Khandesh. A sum of Rs. 3,12,090 was sanctioned for grants-in-aid for sanitary works amongst municipalities, the principal grants being:—Barsi water supply, Rs. 86,500; Ahmedabad water supply, Rs. 24,000; development of Salsette, Rs. 40,000; Sholapur town improvements, Rs. 12,800; and Nasik water supply scheme, Rs. 45,393.

Sanction was accorded to 5 new projects and 36 others were either under construction or consideration. Deputy Sanitary Commissioners completed sanitary surveys of 53 towns and villages, while notes were made in the sanitary inspection books of 218 villages. There is evidence that these reports have been of value and the advice contained therein has been acted on in many instances. There are 336 towns and villages in which sanitary committees exist the majority of them doing good work in keeping their villages clean.

Sanitary Board.

177. The constitution of the Sanitary Board was the same as in 1912-13, with the addition of the Mechanical Engineer to Government as an official member. The Board held two meetings and considered, amongst other matters, water supply and drainage schemes and the distribution of a grant of one lakh placed at its disposal.

Five projects were sanctioned by Government during the year, *viz.*, sewerage of the town of Dhulia, Rs 4,00,000; Igatpuri water supply, Rs. 1,39,075; drainage of Central Offices, Poona, Rs. 17,261; experimental installation of a Paterson Filter at the Poona Cantonment water supply pumping station, Rs. 15,114; and Hyderabad (Sind) water supply, Rs. 4,36,037.

Of the water supply works in progress or completed during the year, the following may be mentioned. Bijapur.—Completed, cost Rs. 48,470. Karad.—Tunnel work, pump well, settling tanks, filter bed, pure water tank and high level reservoir, etc., constructed, cost Rs. 30,125. Ahmednagar.—Work in progress, cost Rs. 1,69,900. Poona.—Connection of settling tanks to city mains, etc., and distribution pipes, cost Rs. 2,45,135 (combined water and drainage scheme). Lonavla.—Construction of dam and waste weir and laying of mains in part, cost Rs. 1,89,042.

Numerous surveys and investigations were undertaken and several projects drawn up. The most important of these, the Ahmednagar drainage scheme, estimated to cost Rs. 8,72,050, and the Surat drainage scheme, estimated to cost Rs. 25,00,000, were well advanced at the end of the year.

The Mechanical Engineer to Government afforded valuable advice in the designing of suitable machinery for water supply and drainage projects. This officer inspected pumping installations at several places and advised the local bodies concerned.

Burma.

178. The total income of municipalities and local bodies was Rs. 1,91,25,924, and of this Rs. 56,52,187 was expended on civil sanitary works, compared with Rs. 53,91,334 in the previous year. The amount spent on water supply was 15½ lakhs against 12 lakhs during 1912-13; on drainage nearly 9 lakhs in both years; on conservancy, 16¾ lakhs against 14½ lakhs; on other sanitary works 15¼ lakhs against 18 lakhs.

From the special sanitary grant of 10½ lakhs, a sum of Rs. 2,22,964 was distributed, of which Rs. 68,503 was for the Kalaw water supply; the next largest grants being of Rs. 39,415 for improvements to the Byapon bazar and of Rs. 24,813 for the Minhla bazar. To the recurring grant of 6 lakhs for improvement of urban sanitation, a balance of Rs. 79,000 from the previous year was added, and the whole amount distributed during the year. The largest grants were for the Ma-ubin water supply, Rs. 89,688, and Moulmein sewage disposal scheme, Rs. 72,453. A sum of Rs. 70,000 was allotted for the Pyawbwe water supply and half a lakh each for the improvement of the Sandoway bazar and the Akyab drainage scheme.

During the year the Sanitary Engineer drew up water supply schemes for 21 towns. A revised drainage scheme for Akyab town, estimated to cost four lakhs, was taken in hand.

Sanitary Board.

179. There were eleven meetings of the Sanitary Board during the year, one each at Letpadam, Meiktila, Syriam, Tavoy, Maymyo, Toungoo, Pyinmana, Henzada, Insein, and two at Mandalay. At each matters of local interest were discussed.

Military Works.

180. The figures shown in previous reports as expenditure on ordinary and special military works, included all expenditure incurred by the Military Works Department. It is proposed in future to show the expenditure, ordinary and special, on sanitary works only. During 1914-15, the expenditure on ordinary original military works, *viz.*, drainage, conservancy, water supply, hospitals, etc., was Rs. 2,35,575, and on repairs Rs. 6,21,690: the expenditure on special military works under the same heads amounted to Rs. 3,98,459.

SECTION VII.

SANITARY WORKS.

158. Among the special grants made by the Government of India to local Governments may be mentioned a non-recurring grant of Rs. 1,00,000 to the Government of the United Provinces for the establishment of an experimental sullage farm at Lucknow; a grant of Rs. 10,000 as a contribution towards sanitary and general improvements of the Residency Bazars, Hyderabad (Deccan); a grant of Rs. 2,00,000 for certain anti-malarial and other schemes of sanitary improvement in Delhi, and a grant of Rs. 1,00,000 for anti-malarial projects for Meerut and Bhim Tal in the United Provinces. The last named was given by the Indian Research Fund Association, who also made an additional grant in April 1915 of Rs. 52,216 for the completion of anti-malarial schemes in Saharanpur and Nagina in the United Provinces. In May 1915 the Government of India sanctioned, on certain conditions, a grant of five lakhs, spread over three years (two lakhs in 1915-16, two in 1916-17 and one in 1917-18), for the drainage and water supply scheme for Peshawar City.

India.

The following paragraphs contain information culled from provincial reports regarding sanitary works carried out or in progress in the several provinces.

159. The gross income of the Delhi municipality during the year 1914-15 was Rs. 13,72,356, as compared with Rs. 12,55,614 in 1913-14, and the total expenditure was Rs. 12,27,884, against Rs. 14,36,014 in the previous year.

Delhi.

From the special sanitary grant of Rs. 4,75,000, made during the year (in addition to allotments from the Sanitary grant of five lakhs made in 1912-13) allotments were made for markets, flush latrines, a new slaughter house, and various other sanitary works.

In the municipal area several improvements were effected in the water supply; a sand washing machine was erected and proved satisfactory. The Subzimandi water channel was completed and the extension of the water supply to Teliwara and Kishanganj is under consideration. Monthly analysis of samples of water yielded uniformly satisfactory results. No new large drainage works were carried out, though several small extensions of open drains and under-ground sewers were executed. The conservancy arrangements were improved considerably: fourteen flush latrines were completed and a number of latrines of the ordinary type erected at various places; several new urinals were also constructed. A number of incinerators and litter sheds were erected and *dalaos* for rubbish were paved. A number of wells received attention, some being filled in, some made mosquito-proof and others repaired and cleaned. Schemes were sanctioned for draining and cleaning the overgrown and swampy portions of the Roshnara and Queen's Gardens.

160. There was no change in the number of municipalities in the Presidency which, excluding Calcutta, number 111. The income of these bodies during 1913-14, apart from the opening balance, extraordinary and debts, amounted to Rs. 55,73,291, an increase on the income of

Bengal.

of the laboratory contains some very interesting figures which demonstrate the marked degree of protection that inoculation confers on the individual exposed to plague infection : they further demonstrate that the vaccine as at present prepared maintains a very high degree of efficiency. Experiment indicates that the amount of protection afforded by inoculation would be still higher were it possible to submit the subject to two inoculations at an interval of a week, the first dose being half the amount at present usually given. Not only does such a procedure confer a greater degree of immunity but it is accompanied by less pain and discomfort. The drawbacks to the procedure on a large scale are, however, obvious. Not only would a larger staff be required than at present, but difficulty is likely to be experienced in getting the average Indian villager to submit to the second inoculation.

Experiments with hydrocyanic acid gas as a plague disinfectant were continued and satisfactory progress was made.

Interesting observations were made as to the relative prevalence of three very closely allied species of rat fleas, *viz.*, *Xenopsylla cheopis*, *X. brazilinsis* and *X. astia*.

Careful microscopic examination is necessary to differentiate these three species which were formerly all grouped together as *X. cheopis*. In Bombay city, Ootacamund and Coonoor *X. cheopis* was found to be the preponderating species and formed between 80 and 90 per cent. of the whole. Recent observations on *Xenopsylla*, interesting and important though they be, are unlikely to throw fresh light on plague problems.

Some interesting observations on the prevalence of guinea-worm disease are recorded in the Annual Report of the Laboratory. The question of bovine tuberculosis also continued to receive attention.

The King Institute of Preventive Medicine, Madras.—Water analysis continued to be an important branch of the activities of the microbiological section of this Institute. During the year under report 617 samples were examined bacteriologically and 277 chemically. Most of the former were samples taken from the experimental filters, work in connexion with which still continues in Madras.

Pathological specimens sent to the Institute for examination and report numbered 5,067, a considerable increase on the previous year's figure.

Approximately seven thousand doses of vaccine were manufactured and issued of which amount rather more than four-fifths were stock vaccines.

Special researches were carried out by members of the staff in connexion with medical entomology, bacillary dysentery and kala-azar and papers recording the results obtained have been published in the *Indian Journal of Medical Research.*

The Pasteur Institute of India, Kasauli.—In spite of the opening of two rival Institutes at Coonoor and Rangoon the attendance at the Kasauli Institute continues to increase.

In the year under report 4,585 persons underwent anti-rabic treatment as compared with 3,984 in 1913. The increased attendance year after year is not due to an increasing prevalence of rabies in India but is directly attributable to a wider dissemination of knowledge regarding the efficacy of Pasteurian treatment. Of those who were treated 53 contracted hydrophobia ; 26 of these died at a greater period than fifteen days after the termination of treatment. These were the failures of treatment. All but three of these patients were bitten on the bare skin and in all but two were the bites multiple. Thus the percentage failure rate was 0·57 as compared with 0·72 in 1913. The statistics of the Institute once more demonstrate the value of cauterization of the wound as soon as possible after infliction of the

bite. Of the 4,585 persons treated 3,742 were bitten by dogs, 781 by jackals: various animals were responsible for the others.

The Pasteur Institute of Southern India, Coonoor.—During the year 1914-15, 1,210 patients were submitted to anti-rabic treatment as opposed to 1,293 in the previous year. Of this number eight died at a greater interval than fifteen days from the completion of treatment. Thus the failure rate worked out at 0·66 per cent.

The Pasteur Institute of Burma, Rangoon, was opened on the 6th July 1915. A memorandum of information for the guidance of patients proceeding to Rangoon for anti-rabic treatment was prepared and circulated. It is too early yet for a report on the working of the Institute.

The foundation stone of a *Pasteur Institute at Shillong*, was laid on the 4th November 1915. It is expected that the buildings will be completed about August 1916.

The Indian Research Fund Association.

182. During 1914 several important inquiries were carried out under the auspices of the Indian Research Fund Association. Chief amongst these were:—

Subject of investigation.	Name of officer in charge.	——
Cholera	Major E. D. W. Greig, C.I.E., I.M.S. ...	Still in progress.
Kala-azar in Assam	Major F. P. Mackie, I.M.S. ...	Closed on 30th November 1914.
Kala-azar in Madras	Dr. V. T. Korke	Closed on 31st March 1915.
Bacteriological examination of water supplies.	Captain J. Morison, I.M.S.	Still in progress.
The prevalence of tuberculosis in India ...	Dr. A. Lankester, M. D.	,,
Pharmacology of cinchona derivatives ...	Major A. C. MacGilchrist, I.M.S. ...	Closed on 22nd February 1915.
Dysentery in Bengal	Captain J. Cunningham, I.M.S. ...	Closed on 20th April 1915.
Goitre	Major R. McCarrison, I.M.S. ...	Closed on 4th November 1914.
Plague prevention in Bombay Presidency	Major J. C. G. Kunhardt, I.M.S., up to 20th April 1915. Dr. G. D. Chitre, L.M.S.	Still in progress.

These special inquiries have been made the subject of numerous contributions to the pages of the *Indian Journal of Medical Research*, the official organ of the Association.

The outbreak of war very largely hampered the active prosecution of research, the majority of the members of the Bacteriological Department having reverted to military duties. That an appreciable amount of very useful work continues to be done, however, is evidenced by the fact that the Journal still continues to issue quarterly and is but little if at all reduced in size.

Publications.

183. During the year a pamphlet on "Hookworm Disease and how to prevent it" was prepared by Major Clayton Lane, I.M.S., of which 8,000 copies were printed and circulated to local Governments by the Government of India, with the suggestion that translations in suitable vernaculars may be made for distribution among the people.

A revised pamphlet, superseding the earlier one drawn up by the late Major G. Lamb, I.M.S., entitled "Rabies and Anti-Rabic treatment in India" was prepared by Captains H. Acton, and R. Knowles, I.M.S., of which 42,000 copies were printed and forwarded to local Governments with the suggestion that copies should be widely circulated and translated into the vernacular where necessary.

Pilgrim Committee.

184. In August 1912, the Government of India suggested to local Governments the desirability of undertaking a comprehensive inquiry into the possibility of improving the sanitary arrangements at centres where Hindu and Muhammadan pilgrims congregate for worship or for starting their journeys to Mecca, etc., and proposed the appointment of a Committee consisting of the Sanitary Commissioner with the Government of India as President with the following members:—(1) The Sanitary Commissioner of the Province, (2) one member of the Indian Civil Service selected locally in each Province, (3) one unofficial Indian gentleman or other qualified person selected locally in each Province and (4) a railway representative to be nominated from its staff, by each railway concerned in pilgrim traffic, who would serve for so long as the Committee remained on that particular line. The scope of the inquiry was to be as wide as possible and to include such questions as lodging-house accommodation, sanitary arrangements on railways and food and water supplies. Inquiries have been conducted in Bihar and Orissa, the United Provinces and Madras, and the reports of the respective Committee have been submitted to the local Governments concerned. The inquiry in the Bombay Presidency is approaching completion.

Deputation.

185. At the request of the Government of Bombay, Major J. C. Robertson, C.I.E., I.M.S., Sanitary Commissioner with the Government of India, was deputed to Aden to examine the water supply scheme of that station. The results of his inquiry were submitted to the Government of India. Advantage was taken of the Sanitary Commissioner's visit for the Sub-Assistant Surgeon attached to the Central Malaria Bureau, Kasauli, to accompany him to obtain information of the anopheline fauna of the settlement. Valuable information and specimens were obtained and a paper on the subject was published in Volume 3, No. I of the Indian Journal of Medical Research.

I assumed charge of the office of the Sanitary Commissioner with the Government of India with effect from the 13th April 1915, from Major J. C. Robertson, C.I.E., I.M.S., granted leave on medical certificate. On the expiry of his leave Major Robertson was placed on military duty under the War Office.

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STATISTICAL TABLES, 1914.

TABLE No.				PAGES.
I.—	EUROPEAN TROOPS.—	Summary.—	Sickness and Mortality by Geographical Groups.	118-119
II.—	„	„	Ratios of Armies	120
III.—	„	„	„ „ Geographical Groups... ...	121
IV.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	122
V.—	„	„	Statistics of officers.—Sickness and mortality among officers of British Army.	123
VI.—	INDIAN TROOPS.—	Summary.—	Sickness and Mortality by Geographical Groups.	12
VII.—	„	„	Ratios of Armies	125
VIII.—	„	„	„ „ Geographical Groups	126
IX.—	PRISONERS.—	Summary.—	A.—Sickness and Mortality by Administrations.	127
	„	„	B.—Sickness and Mortality by Geographical Groups.	128
X.—	„		Ratios of Administrations	129
XI.—	„	„	„ Geographical Groups	130
XII.—	GENERAL POPULATION.—		Provincial Birth and Death Statistics ...	131
XIII.—	„	„	Births	132
XIV.—	„	„	Deaths	132
XV.—	„	„	„ in Towns and Rural Circles ...	133
XVI.—	„	„	„ according to Age	133
XVII.—	„	„	„ „ „ Cause	134
XVIII.—	„	„	„ by months	135
XIX.—	„	„	Ratio of Deaths according to months ...	135
XX.—	„	„	Deaths from Cholera, by Provinces, 1883-1914	136
XXI.—	„	„	„ „ „ by months, in 1914 ...	137
XXII.—	„	„	Details of distribution and occurrence of Cholera in 1914	137
XXIII.—	„	„	Mortality from small-pox	138
XXIV.—	„	„	„ „ Fevers	139
XXV.—	„	„	„ „ Dysentery and Diarrhœa ...	140
XXVI.—	„	„	„ „ Plague	141
XXVII.—	„	„	„ „ Respiratory Diseases ...	142
XXVIII.—	„	„	Vaccination	143

TABLE I.—*Summary Sickness*

Groups.	Years.	Average* strength.	RATIO PER					
			Constantly sick.	Invaliding.	A.—ADMISSIONS D.—DEATHS			
					Influenza.		Cholera.	
					A	D	A	D
Group I.—Burma Coast and Bay Islands	1904-1913	1,249	46	†·89	3·8	...	...	·08
	1913	1,156	40	10·4	...	...	...	...
	1914	1,160	35	12·1	...	...	...	...
„ II.—Burma Inland	1904-1913	1,691	45	†2·4	1·5	...	1·5	1·12
	1913	1,237	38	1·6	...	...	...	...
	1914	1,031	41	...	...	...	...	...
„ IV.—Bengal and Orissa	1904-1913	1,853	49	†7·9	9·4	...	·2	·16
	1913	1,924	43	7·8	...	...	...	...
	1914	1,704	47	8·8	...	...	2·9	...
„ V.—Gangetic Plain and Chutia Nagpur ...	1904-1913	6,441	42	†9·3	5·3	...	1·0	·61
	1913	5,973	29	8·0	·2	...	·3	...
	1914	4,919	26	10·1	6·9	...	·4	...
„ VI.—Upper Sub-Himalaya	1904-1913	13,664	44	†8·1	8·0	...	...	·15
	1913	13,397	31	8·7	2·1	...	·2	...
	1914	11,141	34	7·0	3·5	...	·4	·36
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1904-1913	5,112	45	†8·6	37·1	·02	·2	·20
	1913	5,461	32	4·8	1·6	...	...	...
	1914	5,101	38	9·4	·2	...	...	...
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1904-1913	5,997	45	†9·4	5·8	...	·1	·08
	1913	5,917	31	9·1	5·7	...	...	...
	1914	6,404	27	5·2	5·3	...	...	...
„ IX.—Deccan	1904-1913	10,611	38	†6·5	2·0	...	·5	·36
	1913	11,175	27	9·2	1·6	...	·1	·09
	1914	9,267	29	6·3	·8	...	1·0	·54
„ X.—Western Coast	1904-1913	1,492	48	†10·0	2·1	...	·1	...
	1913	1,455	34	12·4	·7	...	...	...
	1914	1,519	34	3·3	3·3	...	...	...
„ XI.—Southern India	1904-1913	3,533	45	†8·2	3·3	...	·1	·03
	1913	3,411	20	4·4	1·2	...	...	...
	1914	2,869	18	3·8	·3	...	·7	·35
„ XII. a.—Hill Stations	1904-1913	11,728	33	†6·1	5·6	...	·1	·01
	1913	12,228	22	6·9	7·6	...	...	...
	1914	10,039	28	2·8	4·6	...	...	...
„ XII. b.—Hill Convalescent Depôts and Sanatoria...	1904-1913	3,680	55	†10·3	2·2	...	·1	·05
	1913	3,612	41	9·1	...	...	...	...
	1914	3,225	40	3·7	1·5	...	...	·31
INDIA	1904-1913	70,894	41	†7·6	7·2	·00	·3	·27
	1913	70,755	81	7·5	2·7	...	·1	·01
	1914	60,581	32	6·0	2·9	...	·4	·18

*The decennial ratios are worked on the total strength of the ten year period.
† From 1909 to 1913.

and monthly by Geographical Groups.

MILLE OF STRENGTH.

FROM

FROM

Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All Causes.	
A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D
·5	...	1·2	·24	69·7	·56	135·7	·08	1·4	·24	15·5	·88	155·8	·24	792·3	8·09
...	...	...	...	43·3	...	18·2	...	1·7	...	·9	...	116·8	·87	609·9	6·92
...	...	...	...	29·3	...	3·4	...	1·7	...	...	...	107·8	·86	499·1	6·90
...	...	3·1	·65	102·5	·24	72·0	...	1·3	·41	7·8	·35	145·4	·12	765·7	6·27
...	...	...	...	105·9	...	10·5	...	3·2	·21	1·6	...	124·5	...	629·2	·81
...	...	...	...	63·0	...	18·4	...	1·9	...	5·8	...	117·4	...	687·7	1·94
·6	·05	4·5	·65	124·2	·32	72·5	...	3·2	·81	12·7	·38	162·7	·16	749·7	9·34
...	...	2·1	·52	112·3	1·04	20·3	...	1·6	·52	3·1	...	160·6	·52	576·9	9·88
...	...	·6	...	190·7	...	21·1	...	·6	...	3·5	...	112·7	...	900·8	8·22
·8	·03	14·6	2·52	89·4	·17	76·7	·02	3·2	·36	12·3	·45	95·5	·02	690·8	8·90
·3	...	6·2	·17	33·0	...	60·6	...	5·7	·67	4·4	·50	49·6	...	595·5	2·85
1·4	...	5·1	·41	36·2	...	45·7	·20	7·5	1·22	9·1	...	51·0	...	575·7	5·08
·4	·03	12·4	2·47	206·1	·32	43·6	·01	3·7	·44	7·4	·33	79·3	·07	799·5	8·07
·3	·07	2·2	·45	260·7	·37	17·1	...	4·1	·37	3·2	·15	39·8	·07	770·7	3·66
·2	...	3·8	·45	247·4	·27	8·8	...	3·9	·08	6·0	...	48·6	...	746·9	4·85
·6	·06	8·2	1·74	300·7	·33	61·8	·02	4·6	·41	5·1	·06	73·3	·04	974·6	7·65
...	...	·5	·18	261·3	...	14·8	...	4·2	·18	1·6	...	39·7	...	805·7	3·66
...	...	1·8	·59	398·4	1·18	23·3	·39	2·7	·59	1·6	...	37·4	·39	933·0	6·27
1·4	·05	13·0	3·45	251·9	·27	19·8	...	3·0	·30	10·8	·35	102·2	·08	832·1	9·04
·7	...	2·0	·17	77·4	...	11·5	...	3·4	·17	3·0	·17	60·7	·17	584·4	3·38
...	...	2·3	·47	84·6	...	4·5	...	1·4	·16	1·4	...	56·4	...	481·6	3·12
·7	·02	13·2	2·29	102·3	·09	26·5	...	2·4	·22	16·4	·38	94·8	·07	611·3	7·05
·2	...	3·3	·18	92·6	...	7·0	...	1·5	...	14·5	·09	48·1	...	461·0	1·79
...	...	4·4	...	112·3	·11	·6	...	1·5	·22	10·2	·11	59·7	...	467·5	3·34
·9	...	2·2	·69	148·5	·27	9·6	...	1·9	·40	10·5	·07	159·6	·20	667·7	6·83
...	...	2·1	·69	85·9	...	14·4	...	3·4	...	13·1	...	114·1	...	487·3	2·75
...	...	3·9	...	128·4	...	·7	...	2·6	1·97	13·8	1·32	117·2	...	610·3	6·58
·9	·03	1·14	1·44	69·5	·11	23·9	...	1·9	·34	16·5	·14	132·7	·06	739·8	5·58
·9	...	3·5	·29	58·0	·29	2·3	...	3·2	·29	6·7	...	76·8	·29	463·5	2·93
·7	...	3·1	...	73·5	...	4·9	...	3·5	...	8·0	...	63·4	...	475·1	3·14
1·1	...	6·9	1·08	83·2	·14	26·8	...	2·7	·36	5·8	·28	66·1	·12	552·2	4·76
...	...	1·4	·16	64·0	·08	8·5	...	2·0	·08	·8	...	34·1	·08	434·0	2·20
...	...	1·9	...	135·6	...	9·9	...	1·7	·10	3·5	·20	33·6	·10	500·0	2·59
·2	·03	1·6	1·30	143·6	·19	18·1	...	2·8	·27	10·2	·33	83·2	·22	719·2	7·80
...	...	2·2	·55	127·6	...	8·8	...	3·3	·28	8·6	·28	41·5	·83	528·0	6·92
·3	...	·6	...	194·1	...	5·0	...	2·8	...	5·6	1·24	41·6	...	609·6	6·20
·5	·02	1·01	1·85	149·8	·23	39·6	·10	3·0	·35	10·4	·32	91·7	·09	713·8	7·28
·2	·10	2·3	·25	125·5	·13	15·6	...	3·2	·23	5·4	·13	52·5	·13	580·5	3·26
·2	...	6·2	·12	162·8	·16	10·7	·05	2·8	·28	6·2	·16	55·2	·07	614·5	4·32

EUROPEAN TROOPS.

TABLE NO. II.—*Ratios of Armies, 1914.*

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	India.
I.—STRENGTH	31,167	28,014	60,581
II.—*CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH	33·6	31·3	31·8
III.—ADMISSION RATE OF THE YEAR—			
Influenza	2·9	2·9	2·9
Cholera...	·4	·4	·4
Small-pox	·3	·1	·2
Enteric Fever	3·3	2·6	2·9
Malaria...	194·2	133·7	162·8
Sandfly Fever	41·6	6·9	24·6
Pyrexia of uncertain origin	16·0	4·8	10·7
Tubercle of the Lungs	·8	·9	·9
Pneumonia	3·7	1·8	2·8
Respiratory Diseases	16·0	13·5	14·6
Dysentery	5·0	7·6	6·2
Diarrhœa	15·8	12·7	14·5
Hepatic Abscess	·5	·4	·5
,, Congestion and Inflammation	1·1	6·5	8·7
Venereal Diseases	47·1	64·5	55·2
ALL CAUSES ...	691·5	540·8	614·5
IV.—DEATH RATE OF THE YEAR—			
Cholera	·16	·21	·18
Small-pox	...	...	...
Enteric Fever	·39	·04	·21
Malaria	·26	·07	·16
Pyrexia of uncertain origin	·06	·04	·05
Heat-stroke	·58	·11	·36
Circulatory Diseases	·26	·39	·31
Tubercle of the Lungs	·16	·18	·16
Pneumonia	·29	·29	·28
Respiratory Diseases	·03	...	·02
Dysentery	·10	·25	·16
Diarrhœa	...	...	...
Hepatic Abscess	·13	·18	·15
ALL CAUSES ...	4·68	3·96	4·32

* Worked on the aggregates.

TABLE NO. III.—*Ratios of Geographical Groups, 1914.*

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII C.-E. Rajputana, Central India and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII*a* Hill Stations.	XII*b* Hill Convalescent Depôts and Sanatoria.	India.
I.—STRENGTH	1,160	1,031	1,704	4,919	11,141	5,347	5,404	9,267	1,519	2,869	10,039	3,225	60,581
II.—*CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH ...	34·8	41·4	46·7	26·2	34·2	37·3	32·1	29·4	34·3	18·3	28·0	39·5	31·8
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	...	6·9	3·5	·2	6·3	·8	3·3	·3	4·6	1·5	2·9
Cholera	...	...	2·9	·4	·4	...	...	1·0	...	·7	...	...	·4
Small-pox	...	...	...	1·4	·2	...	...	...	...	·7	...	·3	·2
Enteric Fever	...	...	·6	5·1	3·8	2·2	2·8	4·4	3·9	3·1	1·9	·9	2·9
Malaria	29·3	63·0	190·7	36·2	247·4	390·5	100·3	112·3	128·4	73·5	135·9	494·4	162·8
Sandfly Fever	...	...	...	10·6	36·4	139·9	19·6	4·0	7·2	...	7·8	·3	24·6
Pyrexia of uncertain origin ...	3·4	18·4	21·1	45·7	8·8	23·6	5·4	·9	·7	4·9	6·6	5·9	10·7
Rheumatic Fever	3·4	4·8	1·2	3·4	2·7	1·5	4·4	2·9	2·6	2·4	8·6	6·0	3·9
Tubercle of the Lungs ...	2·6	2·9	1·2	·6	·8	1·1	1·7	·6	...	1·0	·1	1·9	·9
Pneumonia	4·7	1·9	·6	7·5	3·9	2·6	1·7	1·5	2·6	3·5	1·7	2·8	2·8
Respiratory Diseases ...	36·2	4·8	21·7	22·8	16·7	11·8	16·7	10·4	11·8	15·0	12·7	12·7	14·6
Dysentery	...	5·8	3·5	9·1	6·0	1·9	4·8	16·2	13·8	8·0	3·5	5·6	6·7
Diarrhœa	12·1	9·7	11·7	20·1	15·7	12·0	24·2	9·3	7·9	7·0	14·4	13·6	14·5
Hepatic Abscess ...	·9	...	·6	·4	·5	·9	·2	·4	...	...	·6	·6	·5
Hepatic Congestion and Inflammation.	11·2	8·7	15·3	20·1	9·1	3·0	10·5	8·6	5·9	7·0	4·3	9·3	8·7
Venereal Diseases	107·8	117·4	112·7	51·0	48·6	36·3	66·8	59·7	117·2	63·4	33·6	41·9	55·2
ALL CAUSES ...	496·1	687·7	900·8	575·7	746·9	932·1	570·7	467·5	610·3	475·1	500·0	604·6	614·5
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	·36	...	...	·54	...	·35	...	·31	·18
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	...	...	...	·41	·45	·56	·56	...	...	...	...	...	·21
Malaria	...	...	...	...	·27	1·12	...	·11	...	...	...	...	·16
Pyrexia of uncertain origin ...	...	...	...	·20	...	·37	...	...	...	...	...	...	·05
Heat-stroke	...	...	...	·81	·81	·75	·37	...	·66	·35	...	...	·36
Circulatory Diseases ...	1·72	·97	·59	...	·36	·56	·19	·11	...	...	·10	·62	·31
Tubercle of the Lungs ...	...	·97	...	...	·08	·19	·37	·11	·66	...	·20	·31	·16
Pneumonia	...	...	...	1·22	·08	·56	·19	·22	1·97	...	·10	...	·28
Respiratory Diseases ...	...	...	...	·20	...	...	...	...	...	...	...	...	·02
Dysentery	...	...	...	...	...	...	...	·11	1·32	...	·20	1·24	·16
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	...	...	·59	...	·18	·56	...	·11	...	...	·10	·31	·15
ALL CAUSES ...	6·90	1·94	8·22	5·08	4·85	6·17	3·70	3·34	6·58	3·14	2·59	6·20	4·32

* Worked on the aggregates.

TABLE NO. IV.—*Admission and death rates from Enteric fever in stations of over 1,000 strength.*

Stations.	1914.		Decennium 1904-1913.		Stations.	1914.		Decennium 1904-1913.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.		Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Rangoon ...	...	...	1·3	·26	Agra	4·9	1·97	13·0	3·97
Fort William ...	...	...	3·2	·41	Mhow and Indore...	4·6	...	13·6	3·18
Lucknow ...	4·4	...	20·1	3·13	Jubbulpore ...	...	...	11·5	2·25
Meerut	7·5	1·25	19·4	4·04	Secunderabad ...	3·1	...	14·7	2·99
Ambala... ...	1·7	·58	8·5	1·99	Poona	12·1	...	16·8	2·16
Sialkot	1·8	..	12·6	2·65	Colaba ...	4·8	...	2·2	·77
Rawalpindi ...	5·6	·40	13·4	2·24	Bangalore ...	4·0	...	15·1	1·93
Nowshera ...	1·9	1·91	7·2	2·58	Ranikhet ...	4·2	...	8·9	1·47
Peshawar ...	3·6	·60	13·8	2·63	Quetta ...	2·0	...	9·1	1·42
Karachi ...	...	...	3·9	·74	Aden	·9	...	3·2	·57

EUROPEAN TROOPS.

TABLE No. V.—*Statistics of Officers.*

SICKNESS AND MORTALITY AMONG OFFICERS OF THE BRITISH ARMY IN 1914.

	Officers.		
	Northern Army.	Southern Army.	India.
STRENGTH	1,004	953	2,087
CASES REMAINING FROM 1913	10·0	7·3	8·1
CONSTANTLY SICK	23·39	22·26	21·45
INVALIDING	14·94	20·99	16·77
ADMISSIONS.			
Influenza	5·0	8·4	6·2
Cholera	...	...	...
Small-pox	2·0	...	1·0
Measles	1·0	1·0	1·0
Whooping cough	1·0	...	·5
Enteric Fever	5·0	7·3	5·7
Malaria	59·8	65·1	58·5
Sandfly Fever	48·8	22·0	33·5
Pyrexia of uncertain origin	34·9	13·6	23·5
Tubercle of the Lungs	3·0	1·0	1·9
Tuberculosis Diseases	...	1·0	·5
Pneumonia	3·0	2·1	2·4
Respiratory Diseases	15·9	12·6	13·4
Dysentery	6·0	10·5	7·7
Diarrhœa	16·9	23·1	19·2
Hepatic Abscess	1·0	...	·5
„ Congestion	7·0	13·6	10·1
Eye Diseases	7·0	3·1	4·8
Anæmia and Debility	12·9	6·3	9·1
Venereal Diseases	6·0	1·0	3·4
ALL CAUSES	607·6	529·9	536·7
DEATHS.			
Cholera	...	...	...
Small-pox	1·00	...	·48
Enteric Fever	1·00	2.10	1·44
Malaria	...	1·05	·48
Pyrexia of uncertain origin	...	...	...
Heat-stroke	...	...	...
Circulatory Diseases	...	...	...
Tubercle of the Lungs	...	...	...
Tuberculosis Diseases	...	...	...
Pneumonia	...	...	...
Respiratory Diseases	...	...	...
Dysentery	...	...	...
Diarrhœa	...	...	...
Hepatic Abscess	...	...	...
Deaths not reported in Medical returns	...	...	...
ALL CAUSES	3·98	4·20	3·83
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES	...	...	6·23

TABLE No. VI.—*Summary—Sickness and Mortality by Geographical groups.*

Groups.	Years.	Average strength.	RATIO PER MILLE OF STRENGTH. Constantly sick.	Invaliding.	A.—Admission from / D.—Deaths from: Influenza. A	Influenza. D	Cholera. A	Cholera. D	Small-pox. A	Small-pox. D	Enteric fever. A	Enteric fever. D	Malaria. A	Malaria. D	Pyrexia of uncertain origin. A	Pyrexia of uncertain origin. D	Pneumonia. A	Pneumonia. D	Dysentery. A	Dysentery. D	Venereal diseases. A	Venereal diseases. D	All causes. A	All causes. D
Group I.—Burma Coast and Bay Islands	1904-1913	1,291	23·7	...	2·0	...	...	...	...	...	...	...	118·9	·39	86·3	·15	3·0	·70	40·3	·08	19·1	...	648·6	3·64
	1913	1,267	24·5	...	...	...	...	...	·8	...	...	...	38·7	·79	80·5	...	7·1	...	8·7	...	30·0	...	702·4	2·37
	1914	1,345	21·6	...	...	...	...	...	...	...	...	...	61·7	...	236·4	...	5·2	...	12·6	...	27·5	...	745·7	1·49
„ II.—Burma Inland	1904-1913	2,901	23·2	...	2·4	...	·0	...	·2	...	·5	·03	189·0	1·07	42·1	·14	2·9	·72	17·9	...	13·7	...	601·9	4·55
	1913	2,662	20·7	...	19·9	...	...	...	...	...	·4	...	153·3	·75	14·7	...	1·9	1·13	8·6	·38	9·8	...	514·7	3·01
	1914	2,239	29·9	...	...	...	...	...	...	...	4·0	3·57	300·1	1·34	64·8	...	4·0	...	4·9	...	21·9	...	778·0	8·93
„ III.—Assam ...	1904-1913	9,278	26·1	...	·9	...	·2	·22	·1	...	·5	·11	276·3	·86	18·5	...	9·1	1·08	32·8	·22	27·4	...	794·6	4·75
	1913	1,010	29·7	...	...	...	...	...	...	...	...	...	270·3	...	85·1	...	5·1	...	18·8	...	25·7	...	973·3	·99
	1914	1,915	24·5	...	6·8	...	...	...	·5	...	·5	·52	132·1	·52	62·7	...	7·3	·52	51·7	...	12·0	...	631·3	2·09
„ IV.—Bengal and Orissa	1904-1913	2,207	26·2	...	5·1	...	·2	·27	·1	...	·8	·27	232·7	·54	57·2	·18	7·6	1·04	51·0	·32	21·3	·05	728·7	4·94
	1913	2,004	25·0	...	1·0	...	...	...	...	...	1·0	·50	153·2	...	88·3	...	4·5	...	12·0	...	31·4	...	805·9	2·99
	1914	2,009	27·9	...	...	...	·5	...	·5	...	·5	...	69·1	...	43·8	...	5·0	·50	33·3	...	26·9	...	908·4	1·00
„ V.—Gangetic Plain and Chutia Nagpur...	1904-1913	6,366	18·7	...	2·1	...	·7	·41	·3	·02	·8	·24	116·7	·47	24·5	·11	7·5	1·29	30·1	·24	5·5	·06	518·2	5·23
	1913	6,140	16·9	...	2·4	...	1·0	·49	·7	...	1·3	·33	15·5	...	41·5	...	5·2	·33	4·9	·16	5·9	...	471·5	2·44
	1914	5,491	22·1	...	3·6	...	1·1	·18	1·8	·18	·2	...	22·0	·18	6·6	...	6·6	1·09	9·8	...	16·9	...	503·4	3·46
„ VI.—Upper Sub-Himalaya	1904-1913	20,443	22·1	...	3·3	...	·2	·16	·5	·03	2·2	·55	166·2	·49	27·5	·11	11·1	1·86	23·5	·11	16·2	·04	581·8	6·22
	1913	21,940	22·4	...	3·5	...	·6	·32	·8	...	2·1	·55	124·1	·22	59·7	·18	7·9	1·41	15·3	·05	11·9	·05	635·1	5·33
	1914	20,603	21·9	...	·6	...	·4	·19	·3	...	2·9	·29	89·1	·29	35·1	·10	8·0	1·50	11·5	·05	14·9	·05	537·6	4·42
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1904-1913	18,404	26·6	...	5·3	...	·3	·20	·5	·03	2·2	·41	310·1	·56	17·7	·09	16·0	2·72	37·5	·14	9·7	·03	852·9	6·53
	1913	17,616	23·7	...	1·2	...	·1	...	·9	·06	1·9	·11	198·7	·34	44·6	·40	13·3	1·87	10·4	·17	7·6	·06	754·1	4·83
	1914	18,791	24·6	...	·1	...	1·6	·64	·1	...	1·5	·16	208·0	·32	50·2	·27	10·2	1·92	16·8	·16	12·1	...	781·6	5·75
„ VIII.—South-Eastern Rajputana, Central India and Gujarat ...	1904-1913	12,217	20·6	...	1·5	...	·3	·11	·8	·02	1·9	·42	197·8	·42	11·2	·05	10·5	1·54	21·6	·08	15·0	·03	590·1	5·16
	1913	11,673	17·1	...	·3	...	·3	·26	1·0	...	1·8	·26	88·7	...	12·5	·09	7·6	1·20	11·3	...	9·5	...	453·9	3·43
	1914	9,763	19·1	...	3·4	...	·4	·41	·2	...	1·6	·51	74·3	·41	29·7	·20	6·8	1·13	13·5	...	12·4	...	483·4	4·81
„ IX.—Deccan ...	1904-1913	17,187	18·9	...	3·2	·01	1·1	·63	·9	·02	1·9	·36	79·7	·29	29·6	·08	7·0	·97	25·6	·09	23·2	·04	474·6	5·10
	1913	17,734	17·6	...	5·0	...	·1	·11	·8	...	1·4	·17	40·0	·06	19·9	...	8·0	1·07	16·5	·06	23·3	·06	423·1	3·95
	1914	14,931	20·5	...	2·4	...	·9	·33	·3	...	1·3	·33	53·3	·07	7·6	...	5·8	·94	15·7	·20	28·0	...	498·1	4·29
„ X.—Western Coast ...	1904-1913	1,806	47·4	...	1·7	...	·1	·11	1·2	·06	·2	·61	223·8	·94	21·2	·17	8·9	2·44	61·6	·61	32·7	·06	776·0	10·13
	1913	1,319	26·2	...	1·5	...	...	...	...	...	...	...	140·3	...	65·2	·76	3·8	1·52	69·0	·76	26·5	...	794·5	5·31
	1914	1,951	26·1	...	1·0	...	·5	·51	1·0	...	2·6	·51	183·0	·51	14·9	...	8·2	...	43·1	...	30·8	...	697·1	4·10
„ XI.—Southern India...	1904-1913	5,042	20·3	...	2·1	...	·7	·50	·5	·04	·5	·06	129·6	·26	23·2	·06	6·4	·89	22·3	·26	25·9	·06	514·3	5·77
	1913	4,491	16·5	...	5·6	...	·2	·22	1·1	...	·2	...	55·9	·22	1·8	...	4·9	·22	8·5	·22	19·6	...	369·0	3·34
	1914	3,922	21·2	...	1·5	...	·5	·51	...	...	1·5	...	48·4	...	1·5	...	5·6	1·53	5·1	...	28·0	·25	573·0	4·59
„ XII.—Hill Stations ...	1904-1913	22,358	24·3	...	4·1	·03	·3	·21	·2	·04	2·5	·54	169·4	·76	29·4	·09	12·0	1·91	23·2	·18	15·8	·64	602·2	7·89
	1913	21,535	22·9	...	·8	...	...	...	·3	...	2·6	·28	112·0	·37	38·3	·19	7·0	·88	3·6	·05	10·1	·05	579·4	4·69
	1914	21,680	23·3	...	1·1	...	·1	·09	·1	...	2·0	·46	135·8	·23	42·9	·14	8·2	1·06	6·5	·09	12·3	·09	623·5	4·29
ARMY OF INDIA	1904-1913	1,28,657	21·8	6·62	3·2	·01	·4	·26	·5	·02	1·7	·35	176·3	·53	24·7	·08	10·1	1·59	28·2	·16	16·1	·03	594·1	5·99
	1913	1,31,512	21·4	5·32	2·3	...	·3	·15	·6	·01	1·6	·28	100·4	·22	35·4	·14	7·6	1·01	12·0	·09	12·6	·03	531·7	4·01
	1914	1,25,074	20·9	7·36	1·3	...	·6	·26	·3	·01	1·6	·33	112·8	·23	35·5	·12	7·3	1·09	14·2	·08	15·6	·03	566·5	4·17

TABLE No. VII.—*Ratios of Armies, 1914.*

	Ratio per 1,000 of the average strength.		
	Northern Army.	Southern Army.	Army of India.
I.—Average Annual Strength	60,614	45,710	125,074
II.—Constantly sick	23·1	22·0	20·9
III.—Admission rate of the year—			
Influenza	1·1	1·8	1·3
Cholera	·8	·4	·6
Small-pox	·4	·2	·3
Enteric Fever	2·0	1·5	1·6
Malaria	126·8	108·4	112·8
Sandfl Fyever	16·8	8·7	11·9
Pyrexia of uncertain origin	38·1	38·6	35·5
Plague	·1	·1	·1
Tubercle of the Lungs	2·9	1·6	2·2
Pneumonia	8·8	6·8	7·3
Respiratory Diseases	30·1	29·8	29·2
Dysentery	13·6	16·1	14·2
Diarrhœa	13·7	21·4	15·6
Hepatic { Abscess	·1	·0	·1
Hepatic { Congestion and Inflammation	1·4	1·5	1·2
Scurvy	·4	1·0	·6
Venereal Diseases	13·9	20·8	15·6
All Causes ...	641·3	567·5	566·5
IV.—Death rate of the year—			
Cholera	·31	·26	·26
Small-pox	·02	...	·01
Enteric Fever	·31	·44	·33
Malaria	·30	·22	·23
Sandfly Fever	...	...	...
Pyrexia of uncertain origin	·11	·11	·12
Plague	·07	·02	·06
Circulatory Diseases	·11	·24	·16
Tubercle of the Lungs	·33	·15	·23
Pneumonia	1·29	1·12	1·09
Respiratory Diseases	·11	·20	·14
Dysentery	·10	·07	·08
Diarrhœa	·03	·09	·06
Hepatic Abscess	·05	...	·02
Anæmia and Debility	·03	·07	·06
All Causes ...	4·50	4·57	4·17

TABLE No. VIII.—*Ratios of Geographical Groups, 1914.*

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India.*
I.—AVERAGE ANNUAL STRENGTH ...	1,345	2,239	1,915	2,009	5,491	20,603	18,791	9,763	14,931	1,951	3,922	21,680	125,074
II.—CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH ...	21·6	29·9	24·5	27·9	21·1	21·9	24·6	19·1	20·5	26·1	21·2	23·3	20·9
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	6·8	...	3·6	·6	·1	3·4	2·4	1·0	1·5	1·1	1·3
Cholera	...	...	...	·5	1·1	·4	1·6	·4	·9	·5	·5	·1	·6
Small-pox	...	...	·5	·5	1·8	·3	·1	·2	·3	1·0	...	·1	·3
Enteric Fever	...	4·0	·5	1·5	·2	2·9	1·5	1·6	1·3	2·6	1·5	2·0	1·6
Malaria	61·7	300·1	132·1	89·1	22·0	89·1	208·0	74·3	53·3	183·0	48·4	135·8	112·8
Sandfly Fever	...	...	...	3·5	·7	6·0	17·7	13·7	5·5	1·0	...	26·2	11·9
Pyrexia of uncertain origin ...	236·4	64·8	62·7	43·8	61·6	35·1	50·2	29·7	7·6	14·9	1·5	42·9	35·5
Plague	...	...	...	...	...	·1	·3	...	·2	·5	...	...	·1
Tubercle of the Lungs ...	·7	·9	3·7	...	2·7	3·6	2·1	1·9	1·1	·5	3·1	2·8	2·2
Pneumonia	5·2	4·0	7·3	5·0	6·6	10·0	10·2	6·8	5·8	8·2	5·6	8·2	7·3
Respiratory Diseases ...	31·2	31·7	30·8	38·8	26·8	27·1	34·5	23·1	35·9	67·1	28·3	24·5	29·2
Dysentery	12·6	4·9	51·7	33·3	9·8	11·5	16·8	13·5	15·7	43·1	5·1	6·5	14·2
Diarrhœa	2·2	11·2	14·6	17·9	13·8	10·6	17·9	12·7	21·6	20·1	14·0	19·7	15·1
Hepatic { Abscess ...	...	...	...	...		·1	·1	...	·1	...	·3	·1	·1
Hepatic { Congestion and Inflammation ...	2·2	·4	1·0	1·0	1·1	1·6	1·5	1·8	1·6	2·1	·8	1·1	1·2
Scurvy	2·2	...	1·0	4·0	·2	·1	·5	·6	·5	·5	...	·5	·6
Venereal Diseases	27·5	21·9	12·0	26·9	16·9	14·9	12·1	12·4	28·0	30·8	28·0	12·3	15·6
ALL CAUSES ...	745·7	778·0	631·3	908·4	503·4	537·6	781·6	483·4	498·1	697·1	573·0	623·5	566·5
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	·18	·19	·64	·41	·33	·51	·51	·09	·26
Small-pox	...	...	...	...	·18	...	...	...	...	...	...	...	·01
Enteric Fever	...	3·57	·52	...	...	·29	·16	·51	·33	·51	...	·46	·33
Malaria	...	1·34	·52	...	·18	·29	·32	·41	·07	·51	...	·23	·23
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	...	...	...	...	...	·10	·27	·20	...	...	...	·14	·12
Plague	...	...	...	...	...	...	·21	...	·07	...	...	...	·06
Circulatory Diseases ...	...	1·31	...	·50	·18	·10	·11	·10	·40	·51		·05	·16
Tubercle of the Lungs ...	...	...	...	...	·18	·39	·16	·10	·07	...	·76	·46	·23
Pneumonia	...	...	·52	·50	1·09	1·50	1·92	1·13	·94	...	1·53	1·06	1·09
Respiratory Diseases ...	...	...	...	...	...	·15	·05	·31	·33	...	...	·18	·14
Dysentery	...	...	...	...	...	·05	·16	...	·20	...	...	·09	·08
Diarrhœa	...	...	...	...	...	...	·11	...	...	·51	·25	·09	·06
Hepatic Abscess	...	...	·52	...	...	...	·05	...	...	...	...	·05	·02
Anæmia and Debility ...	...	...	...	...	...	...	·05	·20	...	...	...	·09	·06
ALL CAUSES ...	1·49	8·93	2·09	1·00	3·46	4·42	5·75	4·81	4·29	4·19	4·59	4·29	4·17

* Including Group Extra India Field Forces and troops on the line of march.

TABLE NO. IX—PART I.—*Summary, Sickness and Mortality—1914.*

Administrations.	Years.	Average Strength.‡	Constantly sick.	RATIO PER MILLE OF STRENGTH.* A.—Admissions D.—Deaths FROM Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Malaria. A.	Malaria. D.	Tubercle of the lungs. A.	Tubercle of the lungs. D.	Pneumonia. A.	Pneumonia. D.	Respiratory Diseases. A.	Respiratory Diseases. D.	Dysentery. A.	Dysentery. D.	Diarrhœa. A.	Diarrhœa. D.	Anæmia and Debility. A.	Anæmia and Debility. D.	All causes. A.	All causes. D.
Burma	1904-1913	14,313	16	1·1	·75	·3	·06	39·9	·41	7·1	3·68	3·2	·90	11·4	·50	21·8	1·70	11·9	·41	3·4	·21	498·3	15·17
	1913	16,748	15	·2	·18	...	...	23·6	·18	6·6	4·00	3·4	·84	10·9	·54	20·1	1·43	10·6	·24	4·5	·42	269·6	16·24
	1914	16,652	15	·1	·06	·1	...	23·0	·30	7·9	4·20	5·1	1·68	11·0	·96	16·0	1·38	7·1	·06	4·3	...	269·9	17·66
Assam	1904-1913	1,566	37	1·7	1·34	·2	·06	289·8	3·32	5·9	2·81	11·4	3·77	23·2	1·15	197·2	11·62	81·9	1·28	19·2	2 87	928·8	38·56
	1913	1,672	37	1·8	1·20	...	...	154·3	4·19	9·9	2·39	13·2	5·98	22·1	1·20	303·2	11·96	78·9	1·79	14·4	2·39	1,023·3	40·07
	1914	1,772	45	3·4	1·13	·6	...	200·9	3·39	8·5	2·82	9·0	4·51	37·8	1·69	333·0	16·93	158·0	...	19·2	·56	1,182·8	43·45
Bengal	1904-1913	11,543	43	·9	·60	·5	·07	263·5	1·75	14·0	4·26	10·5	2·97	35·8	1·09	197·3	5·35	93·2	·80	16·6	·68	966·0	23·86
	1913	11,373	51	·5	·18	·2	...	268·4	·98	12·2	3·10	8·9	2·22	38·2	1·15	181·5	5·85	112·6	·80	19·0	·62	1,068·6	20·85
	1914	11,705	49	·4	·26	·1	...	317·5	1·37	10·4	4·36	9·7	2·14	39·5	·85	167·3	4·53	121·7	·68	26·4	·77	1,060·8	22·55
Bihar and Orissa	1904-1913	79,337	33	2·3	1·18	·9	·10	262·9	1·20	9·4	3·35	7·2	1·88	29·4	·54	145·4	5·71	88·7	1·18	13·1	·72	847·9	22·76
	1913	6,697	32	·7	·30	·1	...	147·5	·45	9·1	3·14	6·6	1·49	31·4	·75	89·7	3·88	99·1	1·34	17·5	·75	714·9	20·01
	1914	6,525	30	·3	·31	·3	·15	148·7	·61	11·5	3·68	4·1	1·53	27·6	·31	81·1	3·07	76·0	·77	16·4	·31	734·3	17·62
United Provinces of Agra and Oudh ...	1904-1913	24,411	26	·5	·26	·8	·07	174·0	·88	7·1	2·46	13·8	3·14	21·0	·92	34·6	2·40	20·8	1·04	8·4	·23	542·0	16·64
	1913	21,822	21	·3	·14	·7	·05	78·2	·55	14·4	1·56	9·7	1·83	19·0	·64	23·4	1·37	15·9	·69	7·5	·14	405·8	11·50
	1914	24,912	21	1·4	·80	·7	...	72·3	·64	7·1	1·93	11·1	1·81	21·4	·56	26·7	1·24	17·8	·56	7·5	·08	396·9	11·86
Punjab	1904-1913	10,900	28	·3	·09	·6	·04	167·5	·41	13·7	5·33	16·5	3·50	41·0	·73	37·3	2·17	39·2	1·18	20·0	·65	652·8	20·83
	1913	12,006	33	·5	·31	1·3	...	101·6	·39	23·6	5 80	18·2	2·32	37·9	·62	32·1	·93	27·7	1·08	20·5	·15	615·5	16·81
	1914	14,375	34	·3	·14	·3	...	98·9	·21	23·9	7·30	21·2	3·69	38·7	·70	63·3	4·59	21·6	1·32	21·1	·28	618·1	25·95
North-West Frontier Province ...	1904-1913	1,445	28	...	...	·5	·07	449·4	·69	6·1	1·52	19·3	3·39	27·1	1·18	68·1	2·28	37·4	·48	12·6	·38	1,010·9	17·30
	1913	2,008	22	...	...	1·5	...	506·0	1·00	9·0	1·99	20·4	3·49	18·4	1·49	75·2	1·99	25·4	...	9·0	·50	944·7	15·44
	1914	2,321	23	·4	·43	...	...	380·4	2·15	3·9	2·59	13·4	4·74	16·4	·86	65·1	2·15	30·2	·86	10·8	·86	756·1	17·66
Central Provinces	1904-1913	3,645	19	·3	·08	·6	·08	138·6	·72	7·3	3·24	6·3	1·46	15·8	1·21	51·7	5·32	31·7	·55	10·1	·36	525·0	20·30
	1913	3,581	12	·3	...	1·1	·28	28·2	·28	7·8	3·07	4·5	1·95	10·3	·28	39·9	1·95	19·3	·28	4·7	...	276·5	13·40
	1914	3,726	11	·8	·54	·3	...	29·3	...	5·1	1·88	7·0	1·84	11·5	·54	42·1	2·15	11·0	·81	2·7	·27	277·5	12·61
Bombay	1904-1913	8,209	26	1·1	·48	·8	·04	117·4	·86	5·1	2·16	13·1	3·50	32·7	1·07	42·7	1·47	38·7	1·22	10·9	·61	568·8	17·96
	1913	9,726	22	·1	·10	·4	...	72·6	·51	4·9	1·44	9·2	2·16	27·2	·93	40·0	1·34	35·2	1·95	6·7	·31	494·8	15·42
	1914	9,873	26	·1	...	·5	..	154·3	1·01	3·8	1·32	17·3	5·06	39·3	1·42	44·8	1·72	50·1	·81	7·8	·41	652·4	17·02
Madras	1904-1913	10,036	20	5·0	2·26	·3	·02	69·4	·82	9·3	2·84	6·1	1·36	23·4	·45	52·6	3·35	8·4	·17	9·3	·43	430·0	17·91
	1913	9,178	16	·2	...	·1	...	32·0	1·09	6·6	1·74	2·3	·44	24·1	·23	23·6	·54	10·9	·22	3·9	·11	353·2	7·74
	1914	9,081	16	1·0	·11	·6	·11	28·6	·88	7·3	2·97	3·1	·44	15·6	1·21	40·6	·99	4·2	...	6·2	·22	304·6	12·44
INDIA†	1904-1913	95,599	27	1·3	·66	·6	·06	163·0	·91	9·1	3·30	10·7	2·59	25·4	·80	68·5	3·19	38·5	·84	11·4	·48	602·7	19·14
	1913	96,745	26	·4	·18	·5	·02	108·2	·62	9·2	2·94	9·0	1·80	24·6	·68	55·6	2·16	38·0	·82	10·6	·35	540·2	15·52
	1914	102,117	26	·7	·33	·4	·02	117·3	·73	9·8	3·50	10·8	2·45	25·7	·83	60·1	2·62	37·5	·61	11·8	·26	548·3	17·98
ANDAMANS	1904-1913	13,176	73	·0	·01	...	...	1,091·5	3·24	9·1	6·15	13·9	5·04	59·8	1·09	117·4	6·37	40·3	·63	·1	·02	1,705·1	31·43
	1913	11,541	53	...	...	...	...	963·6	1·82	3·8	3·47	12·3	5·20	64·6	·87	77·6	3·55	39·5	·35	·3	·09	1,502·3	25·30
	1914	11,996	46	...	...	...	...	840·1	1·75	4·8	2·58	13·3	5·42	53·2	1·58	85·9	3·25	19·7	·33	·3	·08	1,363·7	25·18
INDIA§	1904-1913	108,774	33	1·1	·58	·5	·06	275 4	1·19	9·1	3·64	11·1	2·89	29·6	·84	74·5	3·58	38·7	·82	10·0	·42	36·3	20·63
	1913	108,286	29	·3	·16	·4	·02	199·4	·75	8·6	2·99	9·3	2·16	28·8	·70	57·9	2·31	37·1	·77	9·5	·32	642·8	16·56
	1914	114,113	28	·6	·30	·3	·02	193·3	·84	9·3	3·40	11·1	2·76	28·6	·91	62·8	2·69	35·6	·58	10·6	·25	634·0	18·74

* Excluding subsidiary jails.
† Including Delhi, Sibi, Quetta, Ajmer, Mercara and Secunderabad and excluding Andamans.
‡ The decennial ratios are worked on the total strength of the ten year period.
§ Including Andamans.

TABLE NO. IX—PART II.—*Summary, Sickness and Mortality—1914.*

Groups.	Years.	Average strength.†	Constantly sick.	RATIO PER MILLE OF STRENGTH.* A.—Admissions D.—Deaths from: Influenza. A.	Influenza. D.	Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Enteric fever. A.	Enteric fever. D.	Malaria. A.	Malaria. D.	Pyrexia of uncertain origin. A.	Pyrexia of uncertain origin. D.	Pneumonia. A.	Pneumonia. D.	Dysentery. A.	Dysentery. D.	Diarrhœa. A.	Diarrhœa. D.	All causes. A.	All causes. D.
Group I.—Burma Coast and Bay Islands.	1904-1913	11,346	21	2·3	·03	·4	·28	·3	·05	1·1	·21	179·9	·83	23·3	·02	3·3	1·04	34·0	2·19	25·3	·37	496·8	16·89
	1913	11,556	15	...	...	·3	·26	...	...	3·7	·35	22·3	·26	24·9	·09	2·6	·78	18·2	1·21	9·0	...	279·2	16·27
	1914	11,498	16	·6	...	·1	·09	·1	...	2·3	·61	20·9	·17	29·1	...	3·3	·96	17·7	1·30	8·5	...	288·5	1 8·18
,, II.—Burma Inland	1904-1913	4,364	16	·4	...	2·7	1·86	·3	·05	1·0	·33	41·4	·64	12·5	·02	4·3	1·17	34·9	2·41	17·5	·87	298·0	17·33
	1913	5,192	14	·2	...	...	...	...	...	1·0	·19	26·0	...	12·3	...	5·2	·96	24·3	·93	14·3	·77	248·3	16·18
	1914	5,154	12	2·9	...	...	...	...	...	1·4	·19	27·6	·58	13·2	...	9·1	3·30	1 2·2	1·55	4·1	·19	228·6	16·49
,, III.—Assam	1904-1913	1,493	37	11·0	...	1·7	1·41	·2	·07	·2	·27	292·9	3·28	21·1	...	11·5	3·82	195·9	11·25	82·2	1·27	930·7	38·18
	1913	1,876	38	...	...	1·9	1·27	...	...	...	...	154·2	3·81	161·8	...	14·0	6·35	*306·5	11·42	81·9	1·90	1,040·6	40·61
	1914	1,676	47	2·4	...	3·6	1·19	·6	...	·6	...	203·5	3·58	149·8	1·79	9·5	4·77	337·7	17·90	161·7	...	1,193·9	45·35
,, IV.—Bengal and Orissa ...	1904-1913	13,064	42	7·5	·18	1·5	·79	·5	·07	1·2	·33	290·1	1·63	4·3	·02	10·1	2·85	193·2	5·58	91·1	·87	947·7	24·09
	1913	12,050	49	...	...	·7	·17	·2	...	1·2	·25	257·7	·91	3·9	...	8·6	2·16	175·6	5·97	122·6	·83	1,050·0	21·23
	1914	12,535	48	...	...	·4	·24	·1	...	1·8	·24	310·2	1·36	3·5	·08	9·2	2·15	159·0	4·39	119·1	·64	1,050·8	22·66
,, V.—Gangetic Plain and Chutia Nagpur.	1904-1913	22,436	27	2·4	·04	·9	·53	·8	·07	·5	·12	179·6	1·04	7·5	·03	9·4	2·19	69·0	3·41	41·1	1·05	603·6	18·18
	1913	19,459	25	·5	...	·5	·36	·5	·05	·5	·21	93·8	·62	9·4	·15	6·4	1·59	44·0	2·21	44·7	·87	472·3	13·77
	1914	21,416	23	·1	...	·2	·14	·6	·05	·3	·19	77·0	·56	8·4	·05	7·3	1·12	41·7	2·01	29·7	·61	449·1	12·42
,, VI.—Upper Sub-Himalaya ...	1904-1913	12,568	29	6·4	·08	·1	·07	·7	·10	·6	·16	242·6	·64	13·1	·03	19·7	4·53	37·7	2·28	35·6	1·30	692·6	19·33
	1913	13,477	33	1·8	...	·4	·30	·9	...	·7	·22	158·1	·52	70·8	·07	19·1	2·89	27·2	·96	39·0	1·19	7 01·1	15·14
	1914	15,132	30	5·7	...	1·8	1·06	·3	...	1·0	·33	126·9	·53	17·4	...	20·2	4·10	38·3	1·26	27·2	·99	610·8	18·57
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1904-1913	8,674	27	5·1	·13	·1	·02	·8	·06	·5	·10	188·2	·85	3·6	·03	20·3	4·75	44·7	2·32	31·9	·73	632·3	21·75
	1913	10,258	23	...	...	...	...	1·2	...	·9	...	160·1	·68	7·5	...	14·3	2·24	41·8	1·36	12·2	·78	501·4	17·16
	1914	11,093	28	4·8	·27	·5	·27	·3	...	1·0	·54	152·7	1·17	22·4	...	23·7	6·13	69·4	5·23	22·1	1·17	609·4	29·57
,, VIII.—South-Western Rajputana Central India and Gujarat.	1904-1913	4,268	29	1·9	·02	·4	·19	·6	·02	·2	·07	147·9	·56	·8	·02	16·9	3·61	20·5	1·34	26·2	·72	539·4	15·37
	1913	3,919	21	1·0	...	...	...	·8	...	...	...	89·3	·26	...	...	13·5	1·53	16·3	·81	45·1	·26	417·7	10·40
	1914	4,279	28	...	...	1·4	·70	·9	...	·2	·28	267·4	·70	·2	...	7·0	·70	30·4	·93	64·3	·47	674·7	10·28
,, IX.—Deccan	1904-1913	7,270	25	3·6	·03	·7	·33	·4	·06	·5	·14	138·2	·62	12·3	·06	5·6	1·29	52·3	3·22	41·9	·73	624·1	16·34
	1913	7,934	18	5·9	...	·1	...	·5	·13	1·0	·25	27·0	·13	38·4	·50	5·5	·64	41·6	1·51	46·8	1·01	436·7	11·85
	1914	8,302	19	1·7	...	·4	·24	·5	...	·5	·12	45·2	...	44·8	·12	9·8	2·29	40·2	1·69	30·7	·72	443·1	12·05
,, X.—Western Coast	1904-1913	2,344	22	·0	...	1·7	·68	·6	·09	5·4	1·02	98·8	1·15	12·0	·09	8·7	2·39	58·7	2·56	35·4	1·66	497·3	22·36
	1913	2,188	22	...	...	·5	·46	...	...	...	...	74·5	·91	8·7	...	11·9	3·20	62·6	1·37	20·6	4·11	451·5	20·57
	1914	1,950	25	...	...	...	...	·5	...	1·0	...	103·1	1·03	4·6	...	6·7	2·56	127·7	3.59	30·8	1·54	516·4	22·05
,, XI.—Southern India	1904-1913	9,123	20	·7	·01	5·1	2·16	·3	·01	1·2	·20	69·3	·66	24·3	...	6·0	1·39	51·3	3·20	7·3	·19	426·0	17·13
	1913	8,482	16	1·5	...	·2	...	·1	...	·4	...	31·8	1·06	21·6	...	2·0	·35	22·9	·59	11·8	·24	354·0	7·90
	1914	8,415	16	...	...	1·1	·12	·6	·12	1·7	·24	29·8	·83	15·2	...	3·1	·36	32·7	·95	4·5	...	302·7	11·65
XII.—Hills	1904-1913	581	27	...	...	6·9	5·16	·7	...	2·1	·69	240·0	2·75	8·8	...	22·4	5·51	92·18	7·75	64·4	2·07	875·0	35 93
	1913	583	22	...	...	...	...	3·4	...	...	...	223·0	1·72	...	...	27·4	3·43	111·5	3·43	32·6	1·72	813·0	22·30
	1914	616	26	18·0	...	...	...	...	...	...	...	214·3	3·25	...	...	21·1	4·87	131·5	9·74	42·2	1·62	939·9	34·09
INDIA‡	1904-1913	95,599	27	3·2	·05	1·3	·66	·6	·06	·9	·20	163·0	·91	11·7	·03	10·7	2·59	68·5	3·19	38·5	·84	601·7	19·14
	1913	96,745	26	1·0	·18	·4	·18	·5	·02	1·1	·28	108·2	·62	24·5	·09	9·0	1·80	55·6	2·16	38·0	·82	540·2	15·52
	1914	102,117	26	1·9	·03	·7	·33	·4	·02	1·1	·29	117·3	·73	18·6	·06	10·8	2·45	60·1	2·62	37·5	·61	548·3	17·98
ANDAMANS	1904-1913	13,176	73	4·9	·01	·6	·01	...	...	·1	·04	1,091·5	3·24	10·5	·05	13·9	5·04	117·4	6·37	40·3	·63	1,705·1	31·43
	1913	11,741	53	...	...	...	...	...	...	·2	·09	963·6	1·82	5·1	...	12·3	5·20	77·6	3·55	29·5	·35	1,502·3	25·30
	1914	11,996	46	...	...	...	...	...	...	·9	·33	840·1	1·75	4·8	·17	13·3	5·42	85·9	3·25	19·7	·33	1,363·7	25·18
INDIA§	1904-1913	108,774	33	3·8	·05	1·1	·58	·5	·06	·8	·18	275·4	1·19	11·5	·03	11·1	2·89	74·5	3·58	38·7	·82	736·3	20·63
	1913	108,286	29	·9	...	·3	·16	·4	·02	1·0	·17	199·4	·75	22·5	·08	9·3	2·16	57·9	2·31	37·1	·77	642·8	16·56
	1914	114,113	28	1·7	·03	·6	·30	·3	·02	1·1	·30	198·3	·84	17·2	·07	11·1	2·76	62·8	2·69	35·6	·58	634·0	18·74

* Excluding subsidiary jails.
† The decennial ratios are worked on the total strength of the ten year period.
‡ Including Aden and excluding Andamans.
§ Including Andamans.

TABLE NO. X.—*Ratios of Administrations, 1914.*

	RATIOS PER 1000 OF THE AVERAGE STRENGTH.												
	Burma.	Assam.	Bengal.	Bihar and Orissa.	United Provinces.	Punjab.	N.-W.F. Provnice.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.†
I.—AVERAGE ANNUAL STRENGTH ...	16,652	1,772	11,705	6,525	24,912	14,375	2,321	3,726	9,873	9,081	102,117	11,996	114,113
II.—CONSTANTLY SICK RATE OF THE YEAR	14·8	45·1	48·6	29·7	21·4	33·5	22 8	11·0	26·1	16·3	26·0	45·5	28·0
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	42·5	46·7	28·4	...	32·7	22·5	11·4	24·0	15·8	25·3	...	27·3
III.—ADMISSION RATE OF THE YEAR—													
Influenza	1·3	6·8	...	...	3·6	3·7	...	3·8	...	...	1·9	...	1·7
Cholera	·1	3·4	·4	·3	1·4	·3	·4	·8	·1	1·0	·7	...	·6
Small-pox...	·1	·6	·1	·3	·7	·3	...	·3	·5	·6	·4	...	·3
Enteric Fever	2·0	·6	1·9	·6	·4	1·1	1·3	·5	·6	1·5	1·1	·9	1·1
Malaria	23·0	200·9	317·5	148·7	72·3	98·9	380·4	29·3	154·3	28·6	117·3	840·1	193·3
Sandfly Fever	...	...	...	...	...	...	...	8·1	...	...	·3	...	·3
Pyrexia of uncertain origin ...	24·2	141·6	1·9	22·4	3·2	31·1	...	26·0	28·8	15 0	18·6	4·8	17·2
Tubercle of the Lungs ...	7·9	8·5	10·4	11·5	7·1	23·9	3·9	5·1	3·8	7·3	9·8	4·8	9·3
Pneumonia	5·1	9·0	9·7	4·1	11·1	21·2	13·4	7·0	17·3	3·1	10·8	13·3	11·1
Respiratory Diseases... ...	11·9	37·8	39·5	27·6	21·4	38·7	16·4	11·5	39·3	15·6	25·7	53·2	28·6
Dysentery	16·0	333·0	167·3	81·1	26·7	63·3	65·1	42·1	44·8	40·6	60·1	85·9	62·8
Diarrhœa	7·1	158·0	121·7	76·0	17·8	21·6	30·2	11·0	50·1	4·2	37·5	19·7	35·6
Spleen Diseases	...	...	...	·5	...	1·2	...	...	·6	...	·3	...	·2
Scurvy	·2	1·1	·2	·3	·0	·3	2·2	·3	14·3	...	1·6	8·8	2·4
Anæmia and Debility ...	4·3	19·2	26·4	16·4	7·5	21·1	10·8	2·7	7·8	6·2	11·8	·3	10·6
Abscess, Ulcer and Boil ...	32·9	41·2	75·1	90·4	68·4	101·9	64·2	27·1	46·7	23·8	61·7	104·1	66·1
ALL CAUSES ...	269·9	1,182·8	1,050·8	734·3	396·9	618·1	756·1	277·5	652·4	304·6	548·3	1,363·7	634·0
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	1,132·0	1,053·6	719·4	...	613·2	749·2	292·3	690·9	403·3	362·3	...	642·3
IV.—DEATH RATE OF THE YEAR—													
Cholera	·06	1·13	·26	·31	·80	·14	·43	·54	...	·11	·33	...	·30
Small-pox...	...	...	...	·15	...	...	...	...	...	·11	·02	...	·02
Enteric Fever	·48	...	·26	...	·28	·42	·86	...	·26	·22	·29	·33	·30
Malaria	·30	3·39	1·37	·61	·64	·21	2·15	...	1·01	·88	·73	1·75	·84
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	...	1·69	·09	...	·04	...	...	...	·10	...	·06	·17	·07
Tubercle of the Lungs ...	4·20	2·82	4·36	3·68	1·93	7·30	2·59	1·88	1·32	2·97	3·50	2·58	3·40
Pneumonia	1 68	4·51	2·14	1·53	1·81	3·69	4·74	1·34	5·06	·44	2·45	5·42	2·76
Respiratory Diseases... ...	·96	1·69	·85	·31	·56	·70	·86	·54	1·42	1·21	·83	1·58	·91
Dysentery	1·38	16·93	4·53	3·07	1·24	4·59	2·15	2·15	1·72	·99	2·62	3·25	2·69
Diarrhœa	·06	...	·68	·77	·56	1·32	·86	·81	·81	...	·61	·33	·58
Hepatic Abscess	...	·56	...	...	...	...	...	...	...	...	·01	...	·01
Anæmia and Debility ...	...	·56	·77	·31	·08	·28	·86	·27	·41	·22	·26	·08	·25
Phagedæna, Slough, and Gangrene	·06	...	...	...	...	·07	...	...	...	...	·02	...	·02
ALL CAUSES ...	17·66	43·45	22·55	17·62	11·96	25·95	17·66	12·61	17·02	12·44	17·98	25·18	18·74
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS...	...	43·50	21·85	16·99	...	25·49	17·11	12·47	18·22	11·83	17·83	...	18·56

* Including Delhi, Sibi, Quetta, Ajmere, Secunderabad, Mercara and excluding Andamans.
† Including Delhi, Sibi, Quetta, Ajmere, Secunderabad, Mercara and Andamans.

TABLE NO. XI.—*Ratios of Geographical Groups, 1914.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hills.	India
I—AVERAGE ANNUAL STRENGTH	11,498	5,154	1,676	12,535	21,416	15,132	11,093	4,279	8,302	1,950	8,415	616	102,117
II—CONSTANTLY SICK RATE OF THE YEAR	15·8	12·4	47·1	47·8	23·3	30·0	28·2	23·4	19·2	24·6	16·2	26·0	26·0
III—ADMISSION RATE OF THE YEAR—													
Influenza	·6	2·9	2·4	...	·1	5·7	4·8	...	1·7	...	...	13·0	1·9
Cholera	·1	...	3·6	·4	·2	1·8	·5	1·4	·4	...	1·1	...	·7
Small-pox	·1	...	·6	·1	·6	·3	·3	·9	·5	·5	·6	...	·4
Enteric Fever	2·3	1·4	·6	1·8	·3	1·0	1·0	·2	·5	1·0	1·7	...	1·1
Malaria	20·9	27·6	203·5	310·2	77·0	126·9	152·7	267·4	45·2	103·1	29·8	214·3	87·3
Sandfly Fever	...	...	...	...	...	...	...	...	3·6	...	...	...	·3
Pyrexia of uncertain origin	29·1	13·2	149·8	3·5	8·4	17·4	22·4	·2	44·8	4·6	15·2	...	18·6
Tubercle of the Lungs	8·9	5·6	8·9	12·0	7·8	10·4	22·1	5·8	3·3	9·7	7·1	9·7	9·8
Pneumonia	3·3	9·1	9·5	9·2	7·3	20·2	23·7	7·0	9·8	6·7	3·1	21·1	10·8
Respiratory Diseases	11·4	10·1	39·4	38·3	20·4	35·2	34·5	27·6	21·7	29·7	16·4	79·5	25·7
Dysentery	17·7	12·2	337·7	159·0	41·7	38·3	69·4	30·4	40·2	127·7	32·7	131·5	60·1
Diarrhœa	8·5	4·1	161·7	119·1	29·7	27·2	22·1	64·3	30·7	30·8	4·5	42·2	37·5
Spleen Diseases	...	...	...	...	·1	·3	1·2	...	·6	...	...	...	·3
Scurvy	·3	...	1·2	·2	·1	·1	13·3	·2	·2	1·0	...	...	1·6
Anæmia and Debility	5·0	2·9	18·5	27·5	8·0	19·6	10·3	10·8	5·2	3·6	6·3	39·0	11·8
Abscess, Ulcer and Boil	31·8	35·3	39·4	77·4	73·4	93·8	71·0	65·2	40·6	24·6	25·1	97·4	61·7
ALL CAUSES	288·5	228·6	1,193·9	1,050·8	449·1	610·8	609·4	674·7	443·1	516·4	302·7	939·9	548·3
IV—DEATH RATE OF THE YEAR—													
Cholera	·09	...	1·19	·24	·14	1·06	·27	·70	·24	...	·12	...	·33
Small-pox	...	...	...	...	·05	...	...	...	...	...	·12	...	·02
Enteric Fever	·61	·19	...	·24	·19	·33	·54	·23	·12	...	·24	...	·29
Malaria	·17	·58	3·58	1·36	·56	·53	1·17	·70	...	1·03	·83	3·25	·73
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin	...	...	1·79	·08	·05	...	...	...	·12	...	...	...	·06
Tubercle of the Lung	5·04	2·33	2·98	4·47	2·29	2·97	7·03	2·10	1·20	4·10	2·97	3·25	3·50
Pneumonia	·96	3·30	4·77	2·15	1·12	4·10	6·13	·70	2·29	2·56	·36	4·87	2·45
Respiratory Diseases	·96	·97	1·79	·88	·61	·66	·90	·70	·84	1·03	1·19	...	·83
Dysentery	1·30	1·55	17·90	4·39	2·01	1·26	5·23	·93	1·69	3·59	·95	9·74	2·62
Diarrhœa	...	·19	...	·64	·61	·99	1·17	·47	·72	1·54	...	1·62	·61
Hepatic Abacess	...	...	·60	...	...	...	...	...	...	...	...	...	·01
Anæmia and Debility	...	...	·60	·80	·09	·20	·54	...	·24	...	·24	1·62	·26
Phagedæna, Slough and Gangrene	·09	...	...	...	...	·07	...	...	...	...	...	...	·02
ALL CAUSES	18·18	16·49	45·35	22·66	12·42	18·57	29·57	10·28	12·05	22·05	11·65	34·09	17·98

TABLE No. XII.—*Provincial Birth and Death Statistics, 1914.*

Province.	Year.	Births.			Number of deaths.			Ratio of deaths per 1,000 of population.			Highest death rate.		Lowest death rate.		Mean death rate during previous five years.			Number of deaths of males to every 100 deaths of females.
		Total number.	Ratio per 1,000 of population.	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Delhi	1913 ...	17,801	44·84	...	9,864	6,013	15,877	44·23	35·06	39·99	...	...	...	...	...	...	...	106·11
	1914 ...	19,387	48·86	...	9,501	5,578	15,079	42·14	32·52	37·98	...	...	...	...	...	...	...	103
Bengal	1913 ...	1,529,921	33·75	35·27	72,442	1,259,426	1,331,868	24·91	29·68	29·38	44·84	38·85	4·79	20·51	24·08	29·10	28·78	108
	1914 ...	1,535,281	33·86	35·02	71,875	1,359,414	1,431,289	24·72	32·04	31·57	43·32	52·48	5·03	21·71	24·12	29·10	28·78	107
Bihar and Orissa	1913 ...	1,443,789	42·10	30·90	32,896	966,486	999,382	27·47	29·20	29·14	77·94	35·07	5·01	19·95	30·28	34·39	34·24	109
	1914 ...	1,461,879	42·3	40·9	34,511	942,332	976,843	28·8	28·3	28·3	66·1	36·5	6·5	21·5	29·1	32·3	32·2	105
Assam	1913 ...	200,075	33·06	32·09	2,549	164,830	167,379	21·20	27·79	27·66	31·84	34·08	5·47	20·98	21·95	27·72	27·61	111
	1914 ...	199,343	32·94	32·01	2,726	146,518	149,244	22·19	24·71	24·66	42·55	33·61	4·25	19·54	20·66	27·21	26·99	112
United Provinces of Agra and Oudh.	1913 ...	2,232,999	47·67	40·20	121,453	1,510,240	1,631,693	39·35	34·48	34·84	68·49	49·45	17·41	22·18	43·63	40·51	40·72	110·83
	1914 ...	2,104,554	44·93	42·24	126,060	1,441,206	1,567,266	40·77	32·91	33·46	68·33	54·20	13·62	23·22	41·58	36·81	37·14	108·66
Punjab	1913 ...	878,241	45·4	42·3	60,549	523,235	583,784	35·65	29·66	30·19	69·88	43·95	10·42	18·15	38·91	35·03	35·37	108·9
	1914 ...	895,006	46·3	42·8	63,269	554,804	618,073	36·94	31·48	31·96	78·68	46·63	·92	20·69	33·44	30·79	31·12	106·2
North-West Frontier Province	1913 ...	73,833	36·2	35·0	4,649	45,654	50,303	24·31	24·68	24·65	32·47	28·43	4·74	21·02	26·06	26·08	26·03	110·1
	1914 ...	66,701	32·7	35·3	5,539	47,021	52,560	28·96	25·42	25·75	37·02	34·52	11·00	20·78	24·05	24·28	24·25	112·0
Central Provinces and Berar ...	1913 ...	685,557	49·26	51·52	37,948	383,447	421,395	30·90	30·22	30·28	51·70	41·21	11·27	24·10	42·63	38·23	38·62	112·79
	1914 ...	714,917	51·37	50·80	48,758	461,894	510,652	39·26	36·44	36·69	66·59	45·61	13·90	28·23	41·26	36·64	37·05	111·02
Madras Presidency ...	1913 ...	1,288,618	32·2	32·1	126,409	730,242	856,651	26·2	20·8	21·4	61·9	26·2	4·3	16·8	28·9	23·4	24·0	103·6
	1914 ..	1,340,168	33·5	32·8	146,797	851,470	998,267	30·4	24·2	25·0	114·5	35·1	4·3	16·4	27·7	22·5	23·1	102·7
Coorg	1913 ...	4,529	25·88	26·70	475	5,384	5,859	47·59	32·63	33·48	67·06	38·22	36·05	24·63	56·75	31·00	33·04	117·40
	1914 ...	4,590	26·23	26·88	540	5,418	5,958	54·10	32·84	34·05	77·59	37·05	40·20	24·52	54·14	31·22	32·52	112·94
Bombay Presidency ...	1913 ...	684,803	34·96	35·92	104,545	416,994	521,539	32·90	25·41	26·63	93·00	38·56	8·27	9·77	37·28	28·14	29·61	107·04
	1914 ...	733,076	37·43	35·77	107,413	470,091	577,504	33·78	28·65	29·48	72·12	40·42	9·04	11·02	36·36	28·20	29·51	107·35
Lower Burma	1913 ...	202,606	31·74	33·47	26,388	124,090	150,478	32·89	22·24	23·58	54·71	31·50	12·77	15·79	38·78	24·69	26·46	123
	1914 ...	221,460	34·69	33·00	26,919	119,840	146,759	33·55	21·47	22·99	49·89	26·38	17·31	15·98	36·81	23·95	25·56	121
Upper Burma	1913 ...	118,790	34·20	35·56	11,602	84,248	95,850	39·26	26·51	27·60	59·26	38·70	19·79	20·51	43·79	28·26	29·81	99
	1914 ...	127,423	36·69	35·13	12,207	78,862	91,069	41·26	24·82	26·22	51·20	36·98	16·77	19·37	43·99	28·07	29·57	98
Ajmer-Merwara	1913 ...	21,656	43·19	41·86	Not available		12,960	Not available		25·85	Not available						42·93	112·60
	1914 ...	23,515	46·90	42·42	Not available		15,208	Not available		30·33	Not available						40·48	108·04

TABLE NO. XIII.—*Births—1914.*

Province.	Population under registration.	Ratio of births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Delhi	396,997	...	...	48·86	104	10·88	...
Bengal	45,329,247	41·04	19·40	33·86	107	2·29	...
Bihar and Orissa ...	34,490,038	51·6	35·3	42·3	104	14·0	...
Assam	6,051,507	39·90	28·45	32·94	107	8·28	...
United Provinces of Agra and Oudh.	46,835,108	57·22	25·56	44·93	108·43	11·47	...
Punjab	19,337,146	53·0	19·7	46·3	109·7	14·3	...
North-West Frontier Province	2,041,077	37·3	28·8	32·7	121·2	6·9	...
Central Provinces and Berar	13,916,308	57·15	40·39	51·37	104·32	14·68	...
Madras Presidency ...	40,005,735	40·0	23·1	33·5	104·1	8·5	...
Coorg	174,976	35·95	19·70	26·23	104·64	...	7·82
Bombay Presidency ...	19,587,383	54·58	18·31	37·43	107·29	7·95	...
Burma ... Lower ...	6,382,847	43·39	19·41	34·69	107	12	...
Burma ... Upper ...	3,473,006	43·78	27·26	36·69	105	10	...
Ajmer-Merwara	501,395	55·82	44·06	46·90	111·43	16·57	...

TABLE NO. XIV.—*Deaths—1914.*

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of deaths per 1,000 of population.			Death rate by sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Delhi	396,997	6·82*	33,060*	...	...	37·98	34·60	42·23
Bengal	45,329,247	70,873	639	1·17	21·56	31·57	31·87	31·25
Bihar and Orissa ...	34,490,038	83,181	414	38·8	21·6	28·3	29·7	26·9
Assam	6,051,507	31,845	190	33·58	19·47	24·66	25·15	24·13
United Provinces of Agra and Oudh.	46,835,108	106,402	440	54·83	23·47	33·46	33·35	33·58
Punjab	19,337,146	96,654	200	46·3	20·8	32·0	30·0	34·3
North-West Frontier Province.	2,041,077	13,399	152	34·3	22·0	25·8	25·7	25·8
Central Provinces and Berar.	13,916,308	99,823	139	44·97	28·16	36·69	38·76	34·64
Madras Presidency ...	40,005,735	126,585	316	47·1	17·2	25·0	25·7	24·2
Coorg	174,976	1,582	111	37·05	29·30	34·05	32·48	36·01
Bombay Presidency ...	19,587,383	122,978	159	40·21	13·54	29·48	29·34	29·63
Burma Lower ...	6,382,847	75,866	84	33·31	19·17	22·99	23·87	22·01
Burma Upper ...	3,473,006	35,792	97	40·97	19·74	26·22	27·05	25·46
Ajmer-Merwara ...	501,395	2,711	185	31·05	28·07	30·33	29·67	31·08

* Delhi city only.

TABLE NO. XV.—*Deaths in Towns and Rural Circles compared—1914.*

Province.	Number of registration circles.			Population.			Ratio of deaths per 1,000 of population.		
	Rural	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Delhi ...	8	1	9	171,526	225,471	396,997	32·52	42·14	37·98
Bengal	375	112	487	42,421,996	2,907,251	45,329,247	32·04	24·72	31·57
Bihar and Orissa ...	230	55	285	33,292,685	1,197,353	34,490,038	28·3	28·8	28·3
Assam	77	20	97	5,928,692	122,815	6,051,507	24·71	22·19	24·66
United Provinces of Agra and Oudh.	1,068	93	1,161	43,785,251	3,049,857	46,835,108	32·91	40·77	33·46
Punjab	408	130	538	17,624,428	1,712,718	19,337,146	31·48	36·94	31·96
North-West Frontier Province.	66	13	79	1,849,832	191,245	2,041,077	25·42	28·96	25·75
Central Provinces and Berar.	403	104	507	12,674,459	1,241,849	13,916,308	36·44	39·26	36·69
Madras Presidency...	231	269	500	35,169,748	4,835,987	40,005,735	24·2	30·4	25·0
Coorg	8	2	10	164,995	9,981	174,976	32·84	54·10	34·05
Bombay Presidency	248	113	361	16,407,762	3,179,621	19,587,383	28·65	33·78	29·48
Burma... Lower ...	231	41	272	5,580,459	802,388	6,382,847	21·47	33·55	22·99
Burma... Upper ...	120	18	138	3,177,159	295,847	3,473,006	24·82	41·26	26 22
Ajmer-Merwara ...	Not available		23	Not available.		501,395	Not available.		30·33

TABLE NO. XVI.—*Deaths according to age—1915*

Province.	Ratio per 1,000 of population.																			
	Under one year *		1—5 years.		5—10 years.		10—15 years		15—20 years		20—30 years		30—40 years		40—50 years		50—60 years		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Delhi ...	292·00	281·79	Information not available.																	
Bengal ...	227·28	215·22	45·12	40·47	16·96	14·36	11·26	10·75	14·63	17·23	15·91	19·47	19·96	21·88	27·23	25·59	44·80	42·22	85·30	74·04
Bihar and Orissa.	177·71	164·43	48·8	43·5	13·8	12·4	11 9	11·5	12·3	11·9	14·8	13·3	16·8	15·3	22·6	18·2	34·5	30·6	73·9	60·3
Assam ...	200·32	177·84	30·78	27·68	11·09	9·33	9·54	8·82	12·30	14·97	12·77	17·12	16·28	18 79	22·86	21·86	37·89	34·02	63·19	50·49
United Provinces of Agra and Oudh.	238·15	228·39	75·96	73·30	11·70	11·88	9·07	10·79	10·40	13·50	13·59	15·26	15·93	15·88	22·24	19·53	36·18	31·95	68·71	59·00
Punjab ...	208·98	211·38	59·87	63·46	11·38	13·63	9·02	13·39	9·86	13·57	10·53	13·62	13·15	16·63	18·34	18·79	26·70	27·97	67·53	73·30
North-West Frontier Province.	191·62	180·63	41·1	39·3	10·8	11·2	8·5	10·6	11·9	12·9	11·0	11·1	14·5	16·8	19·8	20·9	28·2	30·0	67·2	73·3
Central Provinces and Berar.	281·89	245·11	76·60	65·20	12·75	11·32	7·67	7·57	9·42	11·09	10·57	11·84	13·10	12·97	19·76	14·92	33·28	27·49	81·17	69·02
Madras Presidency.	206·35	186·27	37·2	36·0	10·7	10·0	7·0	7·0	9·7	12·4	10·9	12·2	13·4	12·6	17·6	14·2	28·3	23·8	70·1	68·7
Coorg ...	304·64	281·77	42·35	40·48	13·57	13·24	9·19	10·75	14·22	16·65	20·76	29 74	26·64	29·40	35·71	38·69	47·44	47·83	85·51	76·82
Bombay Presidency.	201·86	185·15	59·35	57·12	11·77	12·83	7·26	9·13	9·95	13·40	11·98	14·11	14·90	15·18	21·47	16·74	36·09	29·22	87·47	83·58
Burma Lower	221·05	192·37	...	65·79	9·09	8·52	7·30	6·58	11·41	9·66	12·90	...	...	13·36	22·83	...	...	19·33	60·27	57·82
Burma Upper	244·42	219·52	...	83·11	10·78	10·02	6·29	5·77	9·08	8·08	10·80	...	...	12·41	19·08	...	...	16·85	66·76	62·25
Ajmer-Merwara	Information not available.																			
TOTAL ...	218·93	204·29	55·27	48·53	12·91	12·18	9·27	9·84	11·31	13·67	12·60	15·34	16·61	15·34	21·21	19·46	35·90	28·90	73·97	67·11

* Calculated on the number of births during 1914.

TABLE NO. XVII.—*Deaths according to cause—1914.*

Province.	Deaths per 1,000 of Population in 1914.								All causes.	Ratio of deaths in 1913.	Ratio of deaths in 1912.
	Cholera.	Small-pox.	Plague	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Delhi	·03	·10	·03	21·33	·80	10·75	·28	4·63	37·98	39·99	39·26
Bengal	1·96	·21	·01	23·40	·66	·27	·38	4·64	31·57	29·38	29·77
Bihar and Orissa	·9	·2	1·8	17·7	·7	·1	·5	6·2	28·3	29·14	31·01
Assam	1·53	·42	·0001	13·75	2·23	·66	·39	5·75	24·66	27·65	25·04
United Provinces of Agra and Oudh ...	·69	·38	2·22	22·43	·39	·50	·55	6·29	33·46	34·84	29·91
Punjab	·34	·15	3·31	17·87	·69	2·42	·38	6·81	31·96	30·19	26·63
North-West Frontier Province ...	1·13	·16	·08	18·99	·22	·78	·40	3·99	25·75	24·65	23·39
Central Provinces and Berar	1·46	·33	·06	16·85	3·45	3·20	·55	10·78	36·69	30·28	42·34
Madras Presidency	1·7	·7	·2	7·7	1·9	1·1	·2	11·5	25·0	21·4	24·3
Coorg	...	·65	·06	27·44	1·01	·31	·41	4·17	34·05	33·48	38·38
Bombay Presidency	·91	·21	1·02	13·23	2·19	3·37	·39	8·15	29·48	26·63	34·88
Burma { Lower	·32	·04	·81	7·62	·93	·84	·34	12·09	22·99	23·58	26·00
Burma { Upper	·01	...	·67	7·91	·63	·75	·39	15·86	26·22	27·60	28·95
Ajmer-Merwara	·02	·05	...	25·38	·86	·66	·42	2·94	30·33	25·85	38·25

TABLE NO. XVIII.—*Total number of deaths by months—1914.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	RATIO PER 1,000 OF POPULATION 1914.	1913.
Delhi ...	1,298	1,073	1,189	1,271	1,534	1,548	1,067	1,253	1,355	1,283	1,183	1,025	15,079	37·98	39·99
Bengal ...	125,393	97,568	130,722	109,479	90,694	100,687	82,243	95,042	99,544	131,644	177,826	189,947	1,431,289	31·57	29·38
Bihar & Orissa	77,616	72,054	103,561	88,338	77,893	81,596	66,310	75,550	84,960	77,353	85,422	86,190	976,843	28·3	29·14
Assam ...	12,588	10,960	9,307	10,054	11,780	14,394	12,728	10,835	12,264	14,500	14,284	15,550	149,244	24·66	27·66
United Provinces of Agra and Oudh.	138,170	132,146	153,091	161,580	154,935	136,934	104,810	105,525	125,613	125,098	113,716	115,648	1,567,266	33·46	34·84
Punjab ...	49,555	41,378	47,816	54,913	61,981	49,603	40,840	46,126	57,119	56,110	54,153	58,479	618,073	31·96	30·19
North-West Frontier Province.	5,316	3,992	3,711	3,229	3,543	3,688	3,416	4,608	5,423	5,226	5,621	4,787	52,560	25·75	24·65
Central Provinces and Berar.	34,265	31,879	35,587	36,619	47,276	42,712	36,536	49,109	60,517	54,591	42,623	38,938	510,652	36 69	30·28
Madras Presidency.	94,154	73,930	69,668	65,463	73,278	78,539	87,778	89,778	89,310	89,681	89,357	97,381	998,267	25·0	21·4
Coorg ...	422	395	484	465	554	697	654	615	450	383	397	442	5 958	34·05	33·48
Bombay Presidency.	51,384	43,513	47,039	48,096	50,315	44,206	47,170	54,125	51,283	48,166	45,337	46,870	577,504	29·48	26·63
Burma { Lower	13,182	11,228	9,990	10,383	9,505	10,645	13,077	14,436	13,831	13,966	13,357	13,159	146,759	22·99	23·58
Burma { Upper	8,495	6,834	6,483	6,164	5,802	6,576	8,359	8,587	8,276	8,304	8,174	9,015	91,069	26·22	27·60
Ajmer-Merwara.	1,208	1,206	1,248	1,477	2,037	915	1,055	1,580	1,481	1,080	922	989	15,208	30·33	25·85
TOTAL ...	613,046	528,156	619,896	597,531	591,127	572,770	506,543	557,169	611,426	627,335	652,352	678,420	7,155,771	30·00	28·72

TABLE NO. XIX.—*Ratio of Deaths from all causes according to months—1914.*

Province.	ANNUAL * DEATH RATE PER MILLE FOR THE MONTH OF												Ratio for the year.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Delhi	38·50	35·23	35·26	38·95	45·50	47·44	31·65	37·16	41·53	38·05	36·26	30·40	37·98
Bengal	32·57	28·06	33·95	29·38	23·56	27·03	21·49	24·69	26·72	34·19	47·73	49·34	31·57
Bihar and Orissa	26·50	27·23	35·35	31·16	26·59	28·78	22·64	25·79	29·97	26·41	30·13	29·42	28·3
Assam	24·49	23·61	18·11	20·21	22·92	28·94	24·76	21·08	24·66	28·21	28·72	30·26	24·66
United Provinces of Agra and Oudh ...	34·74	36·78	38·49	41·97	38·95	35·57	26·35	26·53	32·63	31·45	29·54	29·07	33·46
Punjab	30·17	27·89	29·11	34·55	37·74	31·21	24·87	28·09	35·94	34·16	34·07	35·61	31·96
North-West Frontier Province	30·67	25·50	21·41	19·25	20·44	21·98	19·71	26·58	32·33	30·15	33·51	27·61	25·75
Central Provinces and Berar	28·99	29·86	30·11	32·02	40·00	37·34	30·91	41·55	52·91	46·19	37·26	32·94	36·69
Madras Presidency	27·71	24·09	20·50	19·91	21·57	23·89	25·83	26·42	27·16	26·38	27·18	28·66	25·0
Coorg	28·40	29·43	32·57	32·33	37·28	48·46	44·01	41·38	31·29	25·77	27·60	29·74	34·05
Bombay Presidency	30·89	28·96	28·28	29·87	30·24	27·46	28·35	32·54	31·85	28·95	28·16	28·17	29·48
Burma ... { Lower	24·32	22·93	18·43	19·79	17·53	20·29	24·12	26·63	26·36	25·76	25·46	24·27	22·99
Burma ... { Upper	28·80	25·65	21·98	21·59	19·67	23·04	28·34	29·11	28·99	28·15	28·64	30·56	26·22
Ajmer-Merwara	28·37	31·35	29·31	35·84	47·83	22·93	24·77	37·10	35·94	25·36	21·89	23·22	30·33
INDIA	30·26	28·86	30·60	30 43	29·18	29·22	25·00	27·50	31·19	30·97	33·28	33·49	30·00

* The ratios in the statement have been calculated with reference to the number of days in each month.

TABLE NO. XX.—*Deaths from cholera in the different provinces in India from 1883 to 1914.*

YEAR.	Delhi.	* Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.W.-Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana.	Central India.	Hyderabad (cantonment stations.)	Mysore.
1883	...	90,439	...	14,908	18,160	190	...	16,235	27,897	36,284	...	37,954	2,185	...	87	797	1,740	1,947	124
1884	...	134,421	...	22,276	30,143	614	...	149	87	75,476	...	13,804	5,515	...	227	1,297	1,018	2,479	330
1885	...	173,767	...	7,753	63,457	1,936	...	21,868	3,683	58,109	...	37,287	7,685	...	100	1,615	4,624	1,387	2,677
1886	...	118,368	...	20,188	34,565	12	...	16,679	976	12,417	...	167	4,027	...	765	173	290	499	10
1887	...	172,578	...	7,941	200,628	8,804	...	12,576	14,396	28,359	3	25,711	2,649	...	384	2,612	8,868	2,831	832
1888	...	111,391	...	9,693	18,704	14,938	...	921	305	58,677	2	36,500	15,982	...	13	32	191	2,057	1,015
1889	...	171,103	...	18,288	48,494	2,838	...	52,588	10,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	...	145,885	...	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	...	229,575	...	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	....	259,398	...	21,552	194,886	75,959	...	29,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	...	126,976	...	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	...	236,150	...	13,497	178,079	113	...	7,043	3,452	42,289	8	33,588	7,428	...	...	2	5,210	1,862	328
1895	...	177,087	...	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	...	226,824	...	17,042	69,147	5,146	...	52,985	12,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	...	196,247	...	33,240	44,208	622	...	57,131	10,122	143,445	105	57,109	8,538	...	19	1,496	13,202	1,839	4,248
1898	...	65,020	...	11,149	2,508	§33	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	...	107,678	...	8,380	8,142	1,816	...	‖76	541	29,082	...	8,579	4,942	2,050	1	498	...	...	123
1900	...	345,878	...	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	...	110,753	...	7,468	53,995	180	117	49	17	81,370	58	13,600	3,552	‡	50	6	72	1	11,351
1902	...	150,971	...	12,658	25,160	371	...	28	16	29,769	...	3,230	1,844	57	32	1,519	12	...	218
1903	...	203,405	...	8,360	47,159	14,688	1,354	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	...	137,701	...	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	...	146,339	...	** 142,312	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	...	192,596	...	168,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	...	205,702	...	77,181	22,438	437	266	4,291	...	81,565	187	7,656	7,964	414	1	64	413	1	4,972
1908	...	268,908	...	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	9,336	2,575	...	737	1,730	937	2,449
1909	...	56,711	...	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	403	1,421	164	1,629
1910	...	162,611	...	117,969	102,402	2,131	1,695	5,316	...	32,594	36	3,694	1,834	177	2	8	2,864	2	1,812
1911	...	124,560	...	39,248	117,689	1,260	12	2,998	...	58,174	6	5,817	2,595	1,596	50	85	1,054	803	210
1912	406	95,467	77,023	(b) 14,303	18,894	1,833	1,329	34,313	...	92,497	...	64,505	6,013	1,173	13	414	9,080	1,190	6,748
1913	37	78,898	70,379	16,407	60,427	5,811	175	15,286	...	37,730	192	5,134	3,704	635	...	4,085	2,823	(c)1,322	8,062
1914	12	89,224	32,115	9,270	32,498	6,656	2,300	29,345	...	68,449	...	17,779	2,042	31	9	1,627	10,075	(c)5,893	849

* Excluding Calcutta from 1883 to 1892.
† Statistics from 1883 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
** Eastern Bengal and Assam.
(a) 1883-1900 included in the Punjab.
(b) Assam only.
(c) For the whole State including cantonment stations.

TABLE NO. XXI.—*Deaths from cholera in British Provinces, by months, during the year 1914.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1914.	1913.
Delhi ...	...	...	...	...	...	1	...	2	9	...	...	...	12	·03	·09
Bengal ...	7,801	7,798	18,600	16,459	6,500	2,048	952	1,027	1,080	2,558	10,015	14,376	89,224	1·96	1·74
Bihar and Orissa.	719	1,262	2,047	3,449	4,648	4,140	2,098	1,995	2,757	3,617	3,340	2,043	32,115	·9	2·05
Assam ...	625	428	330	415	582	1,032	726	415	514	881	1,545	1,777	9,270	1·53	2·71
United Provinces of Agra and Oudh.	259	266	463	2,311	2,757	4,309	1,961	3,037	5,381	4,711	4,262	2,781	32,498	·69	1·29
Punjab ...	4	2	...	...	4	250	595	3,283	2,102	259	147	10	6,656	·34	·30
North-West Frontier Province.	...	...	...	...	...	2	46	878	1,093	52	151	78	2,300	1·13	·08
Central Provinces and Berar	230	791	2,186	1,293	1,783	1,929	1,375	3,528	4,472	2,190	458	110	20,345	1 46	1·10
Madras Presidency.	6,780	3,921	1,916	2,090	2,042	4,897	9,257	10,490	8,493	5,647	5,070	7,846	68,449	1·7	·9
Coorg ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1·10
Bombay Presidency.	80	116	236	1,109	3,493	4,183	3,189	2,853	1,278	740	397	105	17,779	·91	·26
Burma {Lower	100	136	211	174	181	94	241	359	176	116	126	128	2,042	3·2	·58
Burma {Upper	...	...	...	21	4	5	...	...	...	1	...	...	31	·01	·18
Ajmer-Merwara.	..	...	7	...	...	...	...	2	...	...	...	...	9	·02	...
Total ...	16,598	14,720	25,996	27,331	21,994	22,890	20,440	27,869	27,355	20,772	25,511	29,254	280,730	1·18	1·24

TABLE NO. XXII.—*Details of the distribution and occurrence of Cholera during the year 1914.*

Province.	Mortality in 1914.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Delhi	·03	·24	·04	·01	·42	...	...	September.
Bengal	1·96	1·98	2·49	1·93	11·35	4·38	12·90	March.
Bihar and Orissa	·9	2·3	1·4	·9	5·98	3·0	11·9	May.
Assam	1·53	2·66	2·35	1·51	5·33	5·06	9·88	December.
United Provinces of Agra and Oudh ...	·69	1·36	·84	·68	3·29	3·03	13·59	September.
Punjab	·34	·13	1·55	·23	2·03	·74	27·55	August.
North-West Frontier Province ...	1·13	·32	1·10	1·13	9·67	5·07	6·11	September.
Central Provinces and Berar ...	1·46	·97	2·28	1·38	5·57	4·75	21·10	September.
Madras Presidency	1·7	1·3	2·1	1·6	17·23	5·6	22·0	August.
Coorg	...	·40	...	...	...	...	...	...
Bombay Presidency	·91	1·12	·72	·94	6·54	3·45	12·67	June.
Burma {Lower	·32	·60	·40	·31	2·25	2·04	3·10	August.
Burma {Upper	·01	·67	·02	·01	·08	·06	·09	April.
Ajmer-Merwara	·02	·03	...	...	·14	...	...	March.

TABLE NO. XXIII.—*Small-pox mortality—1914.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces:—															
A.—Deaths by months—															
January	2	598	316	142	1,319	260	92	499	2,758	4	628	3	...	...	6,621
February	3	692	378	160	2,142	197	60	586	3,305	27	694	32	2	...	8,278
March	8	1,169	684	303	2,802	238	59	748	3,482	24	837	42	4	3	10,403
April	8	1,267	880	393	3,601	248	43	813	3,020	9	703	51	6	6	10,958
May	6	1,378	824	362	3,630	356	30	646	2,745	12	498	33	...	8	10,528
June	6	1,218	683	305	2,377	444	16	490	2,313	10	277	33	4	4	8,180
July	6	667	609	248	1,303	382	18	297	2,082	11	179	24	...	...	5,826
August	...	437	258	132	393	195	6	179	1,864	6	107	9	...	1	3,587
September	1	324	243	187	139	240	4	79	1,665	3	79	4	...	1	2,969
October	...	248	106	117	40	151	2	72	1,476	...	40	4	...	...	2,256
November	2	482	227	128	83	113	1	73	1,355	2	66	3	...	...	2,535
December	1	1,455	570	188	125	76	...	99	1,824	6	101	3	1	...	4,446
Total ...	43	9,935	5,778	2,575	17,954	2,900	331	4,581	27,889	114	4,209	241	17	23	76,590
B.—Annual death ratios:—															
Ratio per 1,000 of population, 1914.	·10	·21	·2	·42	·38	·15	·16	·33	·7	·65	·21	·04	...	·05	·32
Ratio per 1,000 of population, 1913.	·43	·19	·11	·46	·17	2·00	·70	·46	·4	·23	·50	·28	·30	·04	·41
Difference ...	−·33	+·02	−·09	−·04	+·21	−1·85	−·54	−·13	+·3	+·42	−·29	−·24	−·30	+·01	−·09
Mean ratio per 1,000 during 1909-1913.	·37	·32	·2	·47	·08	·83	·57	·30	·5	·51	·32	·53	·31	1·83	·34
Difference ...	−·27	−·11	...	−·05	+·30	−·68	−·41	+·03	+·2	+·14	−·11	−·49	−·21	−1·78	−·02
II.—District mortality excluding towns:—															
Number of districts affected	Not available.	26	20	7	47	28	5	22	24	5	19	8	5	Not available.	216
Highest district ratio ...		1·48	·4	2·05	2·51	·62	3·01	·95	3·6	1·63	·69	·21	·02		3·6
Name of that district ...		Chittagong.	Patna	Kamrup	Allahabad	Lahore	Bannu	Drug	Kurnool	Nanjarajpatna Taluk.	Kolaba	Akyab	Shwebo		Kurnool
Lowest district ratio ...		·008	·001	·09	·001	·02	·01	·06	·1	·11	·02	·01	·01		·001
Name of that district ...		Khulna	Sambalpur.	Lakhimpur.	Etawa	Kangra	Peshawar	Betul	Nilgiris	Padinalkhand Taluk.	Upper Sind Frontier	Pegu	Mandalay		Etawa
Number of districts without mortality.		...	1	1	1	...	...	...	...	...	7	11	6		27
District death rate per 1,000 of population.		·19	·2	·42	·35	·15	·17	·32	·7	·68	·20	·04	·01		·30*
III.—Town mortality:—															
Number of towns affected	Not available.	74	29	9	70	55	4	55	164	1	42	8	...	Not available.	511
Highest town ratio ...		2·83	2·5	2·04	6·75	3·70	1·35	5·95	12·9	·54	6·24	·37	...		12·9
Name of that town ...		Raniganj	Colgong	Tezpur	Kiratpur	Balabgarh	Buffa	Gadarwara.	Adoni	Virajendrapet.	Bhiwandi	Kyonpyaw	...		Adoni.
Lowest town ratio ...		·02	·04	·16	·02	·01	·04	·03	·02	...	·03	·04	...		·01
Name of that town ...		Garden-Reach.	Muzaffarpur.	Habiganj	Muttra	Lahore	Peshawar	Saugor	Vizagapatam.	...	Sukkur	Rangoon	...		Lahore.
Number of towns without mortality.		38	26	11	23	75	9	49	105	1	71	33	18		459
Town death rate per 1,000 of population.		·62	·2	·37	·79	·15	·09	·36	·9	·20	·31	·04	...		·54*
IV.—Infantile mortality:—															
Children under one year ...	Not available.	735	1,188	682	5,591	765	82	1,582	13,641	...	1,390	3	1	2	25,562
Children 1—10 years ...		1,402	1,689	837	10,636	1,569	133	1,971	8,915	...	2,160	19	...	20	29,351
Percentage of children in total small-pox mortality.		21·51	49·79	58·99	90·38	80·48	64·95	77·56	80·88	...	81·97	9·13	5·88	95·65	71·70

* Excluding Ajmer-Merwara and Delhi.

TABLE NO. XXIV.—*Fever mortality—1914.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	756	90,036	45,850	6,488	91,523	30,150	4,185	15,018	26,054	340	25,803	4,870	2,671	974	344,718
February	576	68,436	39,560	6,382	80,597	23,207	3,083	13,658	21,332	297	21,069	3,751	1,870	990	284,808
March	697	85,638	52,900	5,282	84,977	23,644	2,770	15,197	21,344	387	21,391	3,347	1,880	1,073	320,547
April	780	71,950	52,452	5,887	98,826	21,809	2,321	16,624	21,124	375	21,191	3,514	1,977	1,253	336,921
May	969	65,272	50,796	7,031	105,679	28,884	2,640	23,300	23,840	440	21,269	3,200	1,888	1,713	320,083
June	900	78,086	53,944	8,709	95,992	29,174	2,766	20,897	25,100	561	17,571	3,807	2,021	749	340,277
July	475	64,586	41,903	7,672	72,739	24,329	2,498	16,077	26,208	552	18,346	4,587	2,500	864	283,336
August	624	74,648	47,477	6,276	70,975	25,083	2,702	20,702	27,340	477	21,436	4,524	2,463	1,340	306,067
September	770	78,013	55,678	6,699	86,515	36,044	3,311	26,155	28,564	380	22,158	4,053	2,400	1,354	352,694
October	725	104,521	51,771	7,614	91,873	36,545	4,222	26,242	29,420	305	22,057	4,298	2,440	926	382,959
November	665	137,368	59,592	7,178	85,177	33,845	4,455	21,112	27,697	337	22,730	4,311	2,497	760	407,724
December	532	142,487	57,989	7,981	85,633	32,787	3,797	18,846	29,597	351	24,143	4,392	2,866	830	412,231
Total ...	8,469	1,061,041	609,912	83,199	1,050,506	345,501	38,750	234,528	307,620	4,802	259,164	48,654	27,473	12,726	4,092,345
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1914.	21·33	23·40	17·7	13·75	22·43	17·87	18·99	16·86	7·7	27·44	13·23	7·62	7·91	25·38	17·16
Ratio per 1,000 of population, 1913.	26·18	21·30	18·18	14·43	23·88	17·15	18·52	14·05	6·7	26·20	12·58	8·14	8·93	21·71	16·71
Difference ...	—4·85	+2·10	—·48	—·68	—1·45	+·72	+·47	+2·81	+1·0	+1·24	+·65	—·52	—1·02	+3·67	+·43
Mean ratio per 1,000 during 1909-1913.	25·75	20·54	20·3	14·45	26·10	16·87	17·93	17·36	7·5	28·19	12·99	8·64	8·80	28·91	17·93
Difference ...	—4·42	+2·86	—2·6	—·70	—3·67	+1·00	+1·06	—·50	+·2	—·75	+·24	—1·02	—·89	—3·53	—·77
II.—District mortality excluding towns :—															
Number of districts affected	Not available.	26	21	8	48	28	5	22	24	5	26	19	11	Not available.	243
Highest district ratio ...		40·64	26·0	26·85	46·27	25·44	25·70	25·59	19·9	31·18	26·33	13·58	15·78		46·27
Name of that district ...		Murshidabad.	Purnea.	Goalpara	Moradabad.	Muzaffargarh.	Kohat.	Balaghat.	Vizagapatam.	Nanjarajpatna Taluk.	Ahmedabad.	Akyab.	Mandalay		Moradabad.
Lowest district ratio ...		10·35	7·0	10·19	12·02	6·24	15·18	8·64	2·5	22·18	6·38	3·13	3·97		2·13
Name of that district ...		Howrah	Puri ...	Cachar.	Ballia.	Simla.	Hazara.	Buldana.	North Arcot.	Yedenalkuad Taluk.	Belgaum.	Maubin.	Meiktila.		Maubin.
Number of districts without mortality.		...	...	...	...	...	...	...	...	...	...	...	...		...
District death rate per 1,000 of population.		24·44	17·9	13·83	22·60	18·08	19·52	17·30	8·1	28·33	14·04	8·15	8·29		17·75*
III.—Town mortality :—															
Number of towns affected...	Not available.	112	55	20	93	130	13	104	264	2	113	41	18	Not available.	965
Highest town ratio ...		33·14	29·3	39·51	51·73	34·64	21·26	25·52	21·9	19·67	39·24	15·63	8·35		51·73
Name of that town ...		Dhulian.	Katihar.	North Lakhimpur.	Deoband.	Khangarh	Kohat.	Katol.	Salurn.	Virajendrapet.	Garhi-Yasin.	Tavoy.	Salin.		Deoband.
Lowest town ratio ...		2·11	·6	3·09	7·79	·18	5·03	·59	·1	8·77	·93	·40	·61		·1
Name of that town ...		Mymensingh.	Madhubani.	Nazira.	Mirzapur Bindhachal.	Gojra.	Abbottabad.	Nowargaon.	Settur.	Mercara.	Islampur.	Yandoon.	Myingyan		Settur.
Number of towns without mortality.		...	...	...	...	...	...	...	5	...	...	...	...		5
Town death rate per 1,000 of population.		8·22	10·7	9·56	19·72	15·64	13·83	12·31	5·0	12·82	9·05	3·98	3·85		0·29

*Excluding Ajmer-Merwara and Delhi.

TABLE NO. XXV.—*Dysentery and Diarrhœa mortality—1914.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	18	3,161	2,132	1,164	1,073	888	38	2,410	7,698	6	2,313	393	100	47	21,441
February	19	2,405	1,739	767	927	651	15	2,480	5,589	7	1,993	385	78	53	17,028
March	20	2,587	2,420	684	1,082	674	11	2,257	4,987	6	2,272	336	99	36	17,461
April	15	2,226	2,105	759	1,512	777	37	2,631	4,511	9	2,673	439	94	59	17,845
May	12	1,944	1,991	1,100	1,879	1,103	34	3,451	5,239	26	3,287	425	156	66	20,713
June	22	1,929	2,370	1,441	2,156	1,157	50	3,316	6,165	45	3,588	541	179	25	22,984
July	29	1,803	2,195	1,193	1,945	1,028	35	3,948	7,399	26	5,280	805	375	21	26,085
August	63	2,074	2,494	1,080	2,005	1,354	60	6,324	7,310	23	6,425	719	390	39	30,360
September	40	2,222	2,327	1,265	1,659	1,603	47	7,941	6,994	12	5,465	616	301	41	30,533
October	30	2,590	1,932	1,505	1,574	1,601	41	6,215	6,786	7	4,153	425	151	28	27,040
November	29	3,627	2,043	1,345	1,320	1,299	32	3,998	6,301	5	2,939	394	123	14	23,469
December	23	3,599	2,509	1,216	1,304	1,135	41	3,134	7,011	5	2,573	451	136	22	23,369
Total ...	320	30,167	26,355	13,519	18,436	13,272	441	48,045	75,990	177	42,961	5,939	2,182	431	278,325
Annual death ratios :—															
Ratio per 1,000 of population, 1914.	·80	·66	·7	2·23	·39	·69	·22	3·45	1·9	1·01	2·19	·93	·63	·86	1·17
Ratio per 1,000 of population, 1913.	·65	·73	·74	2·62	·34	·57	·15	2·49	1·6	1·14	1·74	1·14	·49	1·24	1·03
Difference ...	+·15	—·07	—·04	—·39	+·05	+·12	+·07	+·96	+·3	—·13	+·45	—·21	+·14	—·38	+·14
Mean ratio per 1,000 during 1909-1913.	·62	·55	·8	2·50	·37	·54	·17	3·42	1·6	1·05	2·14	1·35	·72	1·08	1·09
Difference ...	+·18	+·11	—·1	—·27	+·02	+·15	+·05	+·03	+·3	—·04	+·05	—·42	—·09	—·22	+·08
II.—District mortality excluding towns :—															
Number of districts affected.	Not available.	26	21	8	48	28	4	22	24	5	26	19	11	Not available.	242
Highest district ratio ...		4·76	4·8	4·99	8,30	3·87	·49	11·13	6·9	1·41	5·86	1·85	1·47		11·13
Name of that district ...		Howrah	Puri	Sibsagar	Garhwal	Rawalpindi.	Dera Ismail Khan.	Akola	Nilgiris	Kiggatnad Taluk.	Sholapur	Sandoway	Pakokku		Akola.
Lowest district ratio ...		·01	·03	·38	.01	·04	·02	·38	·2	·1	·02	·24	·10		·01
Name of that district ..		Dinajpur	Purnea	Goalpara	Bahraich	Montgomery.	Peshawar	Bhandara	Vizagapatam.	Yedenalkuad Taluk.	Larkhana	Toungoo	Mandalay		Bahraich.
Number of disiricts without mortality.		...	...	...	...	...	1	...	...	...	...	...	...		1
District death rate per 1,000 of population.		·51	·7	2·22	·23	·55	·13	3·44	1·6	·64	2·08	·69	·52		1·00*
III.—Town mortality :—															
Number of towns affected	Not available.	112	57	18	83	123	11	104	256	2	103	40	17	Not available.	930
Highest town ratio ...		8·03	8·4	7·09	9·09	8·01	2·81	12·95	10·8	13·20	13·86	7·09	3·41		13·8
Name of that town ...		Khorar	Sambalpur.	Mangaldai.	Hapur	Kangra	Bannu	Nandura	Madras	Virajendrapet.	Sholapur	Zigon	Pyinmana		Sholapur.
Lowest town ratio ...		·12	·1	·21	·08	·10	·16	·06	·04	3·51	·11	·21	·17		·1
Name of that town ...		Dhulian	Deoghar	Sunamganj.	Mubarakpur.	Hazro	Becketganj Khwajagang.	Umerer	Kulasekarapotnam.	Mercara	Uran	Thongwa	Nyaungu		Deoghar.
Number of towns without mortality.		...	4	2	10	7	2	...	13	...	10	1	1		50
Town death rate per 1,000 of population.		2·87	1·7	2·91	2·74	2·11	1·03	3·58	4·1	7·11	2·78	2·57	1·83		3·01*

* Excluding Ajmer-Merwara and Delhi.

TABLE NO. XXVI.—*Plague mortality—1914.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL. 1914.	TOTAL. 1913.
BRITISH PROVINCES.														
Delhi	4	1	4	2	2	...	...	...	...	...	...	...	13	199
Bengal	5	44	119	160	119	64	30	9	3	1	...	...	554	984
Bihar and Orissa	9,228	12,208	24,846	11,637	3,138	584	106	68	90	260	389	1,780	64,334	36,383
Assam	1	...	...	...	...	...	...	...	...	...	...	...	1	...
United Provinces of Agra and Oudh.	16,719	21,613	33,814	19,806	5,765	628	47	114	164	276	1,295	3,713	103,954	107,683
Punjab	1,440	3,244	8,979	18,886	15,895	3,193	167	189	195	626	2,924	8,272	64,010	17,877
North-West Frontier Province	22	14	32	23	27	29	9	3	6	1	...	...	166	82
Central Provinces and Berar ...	1	5	...	...	...	...	...	6	55	198	133	498	896	512
Madras Presidency ...	1,733	952	432	75	16	9	52	46	153	611	627	396	5,102	5,130
Coorg	...	...	...	...	...	...	...	...	..	...	4	6	10	10
Bombay Presidency ...	3,139	2,430	2,629	2,472	1,210	339	507	1,018	1,751	1,854	1,411	1,300	20,060	25,288
Burma { Lower	627	882	892	731	462	370	432	283	132	95	66	200	5,172	4,065
Burma { Upper	650	821	494	86	5	16	28	40	11	17	60	88	2,316	243
Ajmer-Merwara	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ... { 1914 ...	33,569	42,214	72,241	53,878	26,639	5,232	1,378	1,776	2,560	3,939	6,909	16,253	266,588	...
Total ... { 1913 ...	13,979	22,537	47,756	46,663	12,371	3,623	3,723	3,881	5,512	7,514	10,407	20,490	...	198,456
NATIVE STATES, ETC.														
Bengal Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bihar and Orissa Native States	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh Native States.	105	170	309	196	12	2	...	...	8	...	17	16	835	1,188
Punjab Native States ...	200	358	1,269	2,458	2,954	880	54	42	50	49	332	904	9,550	2,327
Jammu and Kashmir States ...	...	8	27	70	67	8	...	...	...	7	67	24	278*	138
Baluchistan	...	...	...	...	...	...	..	...	...	...	...	...	...	...
Rajputana	150	188	389	318	71	...	...	1	...	...	34	8	1,159	2,478
Central India	54	54	44	52	5	...	...	26	572	857	265	356	2,285	173
Native States in Central Provinces.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay Presidency Native States.	805	805	882	799	348	129	133	680	975	1,032	699	509	7,796	5,365
Burma Native States ...	...	...	...	...	...	...	...	...	...	...	...	8	8	16
Hyderabad State	362	243	129	54	4	...	...	305	569	572	294	239	2,771	3,370
Mysore...	376	275	214	96	34	44	113	404	907	756	672	722	4,613	3,495
Bangalore, Civil and Military Station.	96	58	51	47	23	26	52	26	57	78	106	115	735	857
Madras Native States ...	5	...	...	...	...	...	...	...	...	...	...	...	5	6
Total ... { 1914 ...	2,153	2,159	3,314	4,090	3,518	1,089	352	1,484	3,138	3,351	2,486	2,901	30,035	...
Total ... { 1913 ...	2,044	1,912	2,309	2,154	740	462	446	1,037	1,554	1,752	2,890	2,113	...	19,413
GRAND TOTAL ... { 1914 ...	35,722	44,373	75,555	57,968	30,157	6,321	1,730	3,260	5,698	7,290	9,395	19,154	296,623	...
GRAND TOTAL ... { 1913 ...	16,023	24,449	50,065	48,817	13,111	4,085	4,169	4,918	7,066	9,266	13,297	22,603	...	217,869
Calcutta City	...	21	77	136	111	57	28	8	3	1	...	...	442	852
Bombay City	59	119	463	1,133	820	146	83	55	35	10	7	5	2,935	2,605
Madras City	...	1	...	1	...	...	...	...	...	...	...	...	2	3

*Jammu Province only.

TABLE NO. XXVII.—*Mortality from Respiratory Diseases—1914.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I—Mortality by Provinces :—															
A.—Deaths by months—															
January	393	1,350	614	331	2,147	4,574	145	3,955	3,900	8	5,965	478	223	45	24,178
February	368	1,035	565	324	1,997	3,907	134	3,751	3,251	5	5,414	431	162	21	21,375
March	338	1,138	642	275	2,039	3,762	123	3,706	3,480	5	5,980	431	180	25	22,104
April	324	980	539	275	2,005	3,645	128	3,480	3,056	1	5,876	485	163	37	20,994
May	362	898	460	305	1,956	4,243	158	3,629	3,405	5	5,187	330	147	30	21,115
June	400	898	468	310	2,003	3,938	161	3,159	3,207	2	4,634	392	181	21	19,774
July	365	780	436	312	1,458	3,324	158	2,904	3,487	3	4,922	384	226	17	18,827
August	360	955	470	326	2,017	3,582	156	3,613	3,855	6	5,846	494	233	17	21,930
September	332	927	482	267	2,211	3,667	141	4,102	3,770	4	5.667	440	221	19	22,250
October	318	966	401	375	1,926	3,965	116	4,206	3,995	8	5,552	582	300	14	22,724
November	351	1,184	505	417	1,750	3,880	85	3,994	4,009	...	5,114	429	306	31	22,055
December	356	1,278	626	446	2,009	4,298	93	4,076	4,084	7	5.734	500	271	45	23,823
Total ..	4,258	12,389	6,208	4,013	23,518	46,785	1,598	44,575	43,499	54	65,941	5,376	2,593	332	261,149
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1914.	10·75	·27	·1	·66	·50	2·42	·78	3·20	1·1	·31	3·37	·84	·75	·66	1·09
Ratio per 1,000 of population, 1913.	9·17	·26	·17	·71	·47	2·32	·71	2·70	1·0	·41	3·03	·79	·62	·63	1·00
Difference ...	+1·58	+·01	−·07	−·05	+·03	+·10	+·07	+·50	+ 1	−·10	+·34	+·05	+·13	+·03	+·09
Mean ratio per 1,000 during 1909-13.	8·54	·22	·1	·60	·44	2·39	·77	2·92	·9	·38	3·08	·86	·69	·61	·98
Difference ...	+2·21	+·05	...	+·06	+·06	+·03	+·01	+·38	+·2	−·07	+·29	−·02	+·06	+·05	+·11
I.—District mortality excluding towns :—															
Number of districts affected.	Not available.	26	21	8	48	28	5	22	24	2	26	19	11	Not available.	240
Highest district ratio ...		·76	1·4	1·75	11·44	11·70	·91	9·28	2·6	·05	9·42	1·41	1·11		11·70
Name of that district ...		Howrah	Puri	Lakhimpur.	Hamirpur.	Gurdaspur.	Hazara	Saugor	Nilgiris	Nagarajapatna Taluk.	Kaira	Tavoy	Shwebo		Gurdaspur.
Lowest district ratio ...		·005	·002	·09	·01	·001	·14	·23	·2	·03	·004	·03	·01		·001
Name of that district ...		Noakhali	Shahabad	Goalpara	Basti	Multan	Peshawar	Bhandara	Vizagapatam.	Yedenalknad Taluk.	Upper Sind Frontier.	Toungoo	Myingyan		Multan.
Number of districts without mortality.		...	...	...	...	...	...	...	...	3	...	...	...		3
District death rate per 1,000 of population.		·09	·1	·66	·24	2·18	·47	2·93	·9	·02	2·64	·37	·26		·83*
II.—Town mortality :—															
Number of towns affected	Not available.	109	42	16	89	128	13	104	217	2	102	37	18	Not available.	877
Highest town ratio ...		7·20	3·6	4·48	18·93	18·12	7·11	16·32	10·3	7·18	18·23	8·66	14·75		18·93
Name of that town ...		Darjeeling	Sambalpur.	Tezpur	Konch	Dalhousie	Haripur	Nowargaon.	Coonoor	Mercara	Kaira	Kyonpyaw.	Pyawbwe		Konch
Lowest town ratio ...		·07	·07	·15	·02	·03	·58	·17	·02	1·62	·17	·11	·34		·02
Name of that town ...		Murshidabad.	Arrah	Karimganj.	Jhansi	Multan	Kulachi	Umerer	Masulipatam.	Virajendrapet.	Halla	Letpadan	Kyaukse		Jhansi
Number of towns without mortality.		3	13	4	4	2	...	...	52	...	11	4	...		93
Town death rate per 1,000 of population.		2·93	·6	·92	4·15	4·86	3·77	6·00	2·1	5·11	7·12	4·12	5·93		3·92*

* Excluding Ajmer-Merwara and Delhi.

TABLE NO. XXVIII.—*Vaccination.*

A.—Total Primary vaccinations and Re-vaccinations, successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1914-15.

Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of persons vaccinated by each vaccinator of the Special Staff.	Total cost of the Special† Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccination.	Primary	Re-vaccination.	Under one year.	1 to 6 years.			
								Rs.	Rs. A. P.
Delhi	12,220	3,359	98·91	72·13	8,490	781	2,225	2,983	0 4 3
Bengal	1,137,879	460,749	97·66	64·01	359,017	630,844	1,087	1,35,211	0 2 3
Bihar and Orissa	1,245,824	68,218	99·68	72·63	639,734	573,756	1,150	98,421	0 1 2
Assam	280,292	39,724	96·22	68·69	70,207	157,723	907	62,170	0 3 7
United Provinces of Agra and Oudh.	1,543,567	110,817	97·35	71·76	1,020,295	420,079	1,784	2,07,168	0 1 11
Punjab	671,261	165,378	97·13	70·69	523,465	94,770	3,078‡	1,16,947	0 3 3
North-West Frontier Province ...	141,546	12,633	98·66	88·39	83,052	38,682	3,965§	15,171	0 1 8
Central Provinces and Berar ...	526,214	76,429	97·21	63·27	414,369	80,658	2,060	95,604	0 2 6
Madras	1,512,515	176,407	90·8	79·1	636,268	582,760	2,042‖	3,18,066**	0 3 10
Coorg	8,825	5,796	96·71	85·33	674	4,437	1,554	3,027	0 3 10
Bombay	711,279	63,596	99·10	57·03	543,393	105,944	1,697	3,55,759	0 8 5
Burma	405,724	66,843	94·92	60·54	108,333	184,852	1,640¶	2,06,269	0 8 5
Ajmer-Merwara	15,805	101	97·23	85·00	12,093	2,539	1,050	3,430	0 3 8
Total ...	8,212,851	1,250,950	95·56	68·38	4,410,290	2,877,825	1,558	1,740,226	0 3 4

* Excluding those the results of which were not known.
(†) Excluding Dispensaries,
(‡) Including vaccinations performed in cantonments.
(§) Including vaccinations performed in Cantonments and Political Agencies.
(‖) Excludes average of work done by each medical subordinate.
(¶) Excluding the work done by private medical practitioners.
(**) Excluding Madras Presidency circle.

B.—Vaccination operations performed by the Special and Dispensary Establishments separately, deaths from small-pox, etc., during the official year 1914-15.

Province.	Population.	Number of operations (primary and re-vaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small pox*.	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Delhi	396,997	15,579	...	15,579	28·22	53·47	43	·10
Bengal	43,471,942†	1,478,131	120,497	1,598,628	30·04	20·65	9,935	·21
Bihar and Orissa	34,638,684	1,313,860	182	1,314,042	36·69	45·52	5,778	·2
Assam	7,059,857	317,807	2,209	320,016	41·63	24·86	2,575	·42
United Provinces of Agra and Oudh ...	46,835,108	1,654,036	348	1,654,384	33·22	54·46	17,954	·38
Punjab	19,566,432	835,147	1,492	836,639	36·79	66·88	2,900	·15
North-West Frontier Province ...	2,910,899	154,098	81	154,179	50·05	71·33	331	·16
Central Provinces and Berar ...	13,916,308	602,643	...	602,643	38·93	74·44	4,581	·33
Madras	41,411,849‡	1,688,889	33	1,688,922	34·8	38·41	27,889	·7
Coorg	174,976	14,280	341	14,621	74·08	9·61	114	·65
Bombay	22,643,744	767,569	7,206	774,775	29·88	59·99	4,209	·21
Burma	12,115,217	469,471	3,096	472,567	33·21	22·34	258	·03
Ajmer-Merwara	501,395	15,906	Not available	15,906	29·81	60·30	23	·05
Total ...	245,643,408	9,327,416	135,485	9,462,901	34·19	44·89	76,590	·32

* For the Calendar year.
† Excludes 2,011,184, the population of other municipalties except Calcutta.
‡ Excludes the population of the cantonments of Bangalore and Secunderabad.

EAST INDIA (SANITARY MEASURES).

REPORT

ON

SANITARY MEASURES IN INDIA

IN

1915–1916.

VOL. XLIX.

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TABLE OF CONTENTS.

SECTION I.

EUROPEAN ARMY OF INDIA.

PARA.		PAGE.
1.	Introductory	1
2.	Deaths from all causes in India	2
3.	Northern and Southern Armies	2
4.	Diseases	2
5.	Cholera	2
6.	Small-pox	3
7.	Measles	3
8.	Malaria	3
9.	Enteric fever	6
	Paratyphoid fevers	6
	Anti-enteric inoculation	8
10.	Pyrexia of uncertain origin	27
11.	Scarlet fever	28
12.	Sandfly fever	28
13.	Plague	29
14.	Diphtheria	29
15.	Dengue	29
16.	Rabies	29
17.	Beri-beri	29
18.	Dysentery	30
19.	Liver abscess	30
20.	Pneumonia	30
21.	Tubercle of the lungs	30
22.	Heat-stroke and Sun-stroke	30
23.	Poisoning	30
24.	Venereal diseases	30
25.	Invaliding	33
26.	Officers	35
27.	Women	35
28.	Children	36

SECTION II.

INDIAN ARMY.

29.	Introductory	39
30.	Admissions	39
31.	Deaths	39
32.	Northern and Southern Armies, Groups	41
33.	Stations and Regiments	41

PARA.		PAGE
34.	Cholera	42
35.	Small-pox	42
36.	Enteric fever	42
37.	Malaria	44
38.	Pyrexia of uncertain origin	45
39.	Sandfly fever	46
40.	Dengue	47
41.	Malta fever	47
42.	Kala-azar	47
43.	Relapsing fever	47
44.	Beri-beri	47
45.	Plague	47
46.	Scurvy	47
47.	Tubercle of the lungs	48
48.	Pneumonia	49
49.	Dysentery	49
50.	Colitis	49
51.	Venereal diseases	49
52.	Suicides	50
53.	Guinea-worm disease	50
54.	Ankylostomiasis	50
55.	British Officers	51

SECTION III.

GENERAL POPULATION.

56.	Agricultural conditions	53
57.	Births and deaths	53
58.	Chief diseases	54
	Cholera	55
	Small-pox	55
	Plague	55
	Fevers	55
	Dysentery and diarrhœa	56
	Respiratory diseases	56
59.	Delhi	56
60.	Bengal	56
61.	City of Calcutta	58
62.	Port of Calcutta	58
63.	Assam	58
64.	Bihar and Orissa	59
65.	United Provinces	60
66.	Punjab	62
67.	North-West Frontier Province	63
68.	Central Provinces	64

PARA.		PAGE.
69.	Madras	65
70.	City of Madras	66
71.	Port of Madras	66
72.	Coorg	67
73.	Bombay	67
74.	City of Bombay	68
75.	Port of Bombay	69
76.	Burma	69
77.	City of Rangoon	70
78.	Port of Rangoon	70
79.	Ajmer-Merwara	70
80.	Deaths of civil officers and pensioners	70

SECTION IV.

JAILS OF INDIA.

81.	The prison population in 1915	73
82.	Total sickness and mortality rates	73
83.	Malaria	74
84.	Dysentery	74
85.	Tubercle of the lungs	75
86.	Pneumonia	75
87.	Cholera	75
88.	Enteric fever	75
89.	Bengal	75
90.	Assam	76
91.	Bihar and Orissa	77
92.	United Provinces	78
93.	Punjab	78
94.	North-West Frontier Province	79
95.	Central Provinces	80
96.	Bombay	81
97.	Madras	81
98.	Burma	82
99.	Andamans	83

SECTION V.

VACCINATION.

100.	Vaccination in India	85
101.	Vaccine Lymph	86
102.	General remarks	86
103.	Vaccination among troops	87

PARA. PAGE.

SECTION VI.

MEDICAL INSTITUTIONS.

i.—Civil Hospitals and Dispensaries (State-Public, Local Fund, and Private-aided.)

104. India 89
105. Delhi 90
106. Bengal (excluding Calcutta) 90
107. Calcutta 90
108. Assam 90
109. Bihar and Orissa 90
110. Central Provinces 91
111. United Provinces 91
112. Punjab 91
113. North-West Frontier Province 92
114. Baluchistan 92
115. Burma 92
116. Bombay 92
117. Madras 93
118. *ii.—Civil Hospitals and Dispensaries (State-Special Railway and private non-aided).* 93
119. *iii.—Lunatic Asylums* 95

iv.—Medical Colleges.

120. Bombay 96
121. Madras 97
122. Punjab 98
123. Bengal 99
124. United Provinces 99

v.—Medical Schools.

125. Bengal 100
126. Madras 101
127. Bombay 101
128. United Provinces 101
129. Punjab 102
130. Burma 102
131. Bihar and Orissa 102
132. Assam 103
132-A. The X-Ray Institute of India, Dehra Dun 103

SECTION VII.

SANITARY WORKS.

133. India 105
134. Delhi 105

PARA.		PAGE.
135.	Bengal	105
136.	Sanitary Board	106
137.	Assam	106
138.	Sanitary Board	107
139.	Bihar and Orissa	107
140.	United Provinces	107
141	Sanitary Board	108
142.	Punjab	108
143.	Sanitary Board	108
144.	North-West Frontier Province	108
145.	Central Provinces	108
146.	Sanitary Board	109
147.	Madras	109
148.	Sanitary Board	109
149.	Coorg	109
150.	Bombay	109
151.	Sanitary Board	110
152.	Burma	110
153.	Sanitary Board	110
154.	Military Works	110

SECTION VIII.

GENERAL REMARKS.

155.	Laboratories	111
	Central Research Institute, Kasauli	111
	King Institute of Preventive Medicine, Madras ...	111
	Bombay Bacteriological Laboratory	112
	Pasteur Institute, Kasauli	113
	Pasteur Institute of Southern India, Coonoor ...	113
	Pasteur Institute of Burma, Rangoon	113
156.	Indian Research Fund Association	113
157	Pilgrim Committee	115

REPORT
ON
SANITARY MEASURES IN INDIA
1915-16.

SECTION I.

EUROPEAN ARMY OF INDIA.

(From the Director, Medical Services in India.)

1. The average strength of European troops during 1915 was 44,891 (15,999 Regulars *plus* 28,892 Territorials), warrant officers, non-commissioned officers and men as against 60,581 in 1914. As regards the health of the European troops it will be seen from the statement in the margin that the rates of admissions, constantly sick, deaths, and invaliding, were all higher than those of the previous year. Increased rates were reported only from the Northern Army and were chiefly due to the greater prevelance of influenza, enteric fever, sandfly fever, respiratory diseases, and diarrhœa. Malaria, pyrexia of uncertain origin, and dysentery were less prevalent than in 1914.

	1910-14.	1914.	1915.
Admissions	567·2	614·1	823·1
Constantly sick	30·43	31·75	39·98
Deaths	4·51	4·32	5·95
Invalids	7·03	6·01	19·80
Average period of illness of each soldier, calculated on average strength.	10·09	11·59	14·26
Average duration of each case of sickness.	19·39	18·87	17·33

There were 36,952 (11,207 Regulars *plus* 25,745 Territorials) admissions from all causes during the year, as compared with 37,205 in 1914, a decrease of 253.

The following table gives the incidence of sickness among the European troops (Regulars and Territorials) in the principal stations in India during 1915 :—

Stations having an average strength of over 1,000.

Stations.	Average strength.	Admissions.	Deaths.	Invalids sent home.	Average constantly sick.	Ratio per 1,000 of strength.			
						Admissions.	Deaths.	Invalids sent home.	Average constantly sick.
Lucknow	1,320	851	11	36	44·28	644·7	8·33	27·27	33·54
Meerut...	1,190	978	9	12	50·27	821·8	7·56	10·08	42·24
Rawalpindi	2,271	1,584	11	19	90·62	697·5	4·84	8·37	39·90
Nowshera	1,145	1,203	6	15	50·36	1,050·7	5·24	13·10	43·98
Peshawar	1,803	2,106	26	18	91·26	1,168·1	14·42	9·98	50·62
Mhow	1,328	982	8	24	51·95	739·5	6·02	18·07	39·12
Jubbulpore	1,056	1,229	5	96	47·93	1,163·8	4·73	90·91	45·39
Secunderabad	2,132	1,757	9	87	75·80	824·1	4·22	40·81	35·51
Poona	1,299	1,089	5	18	63·23	838·3	3·85	13·86	48·68
Quetta	2,868	2,790	8	30	120·79	972·8	2·79	10·46	42·12
Jhansi	1,088	718	16	20	43·24	659·9	14·71	18·38	39·7

Deaths from all causes in India.

2. There were 267 deaths, as compared with 262 during the previous year, giving a ratio of mortality of 5·95 per 1,000 of strength against 4·32 in 1914.

The chief causes of deaths were:—pneumonia 17, enteric fever 16, local injuries 28, heat-stroke 33, malaria 16, appendicitis 14, dysentery 13, abscess of the liver 9, suffocation from submersion, cholera, and valvular disease of heart 8 each, tubercle of lungs, gastritis, and syncope 5 each, inflammation of brain 4, rheumatic fever 3. There were three fatal cases of 'poisoning'.

Northern and Southern Armies.

3. The relative health of the troops of the Northern and Southern Armies is shown in Table I. The rates of sickness and deaths were higher in the Northern Army than in the Southern; this was due to the greater prevalence of all the principal diseases, except influenza, small-pox, tubercle of the lungs, dysentery and venereal diseases which were more prevalent in the Southern Army.

Diseases.

4. There were increased admission rates in all the Divisions during 1915.

The following table compares the admission and death rates in Divisions during 1915 and 1914, respectively:—

Divisions.	1915.		1914.	
	Admission rate.	Death rate.	Admission rate.	Death rate.
1st Division	1,016·3	9·74	1,040·2	5·58
2nd Division	725·8	3·88	712·5	3·31
3rd Division	848·4	5·86	699·6	4·89
4th Division	799·1	4·19	641·8	5·10
5th Division	797·9	8·83	557·2	2·85
6th Division	805·1	3·42	513·1	4·49
7th Division	783·2	4·75	556·6	4·22
8th Division	840·4	8·69	636·3	5·63
9th Division	902·1	5·58	439·4	3·44
Burma Division	882·3	3·35	582·3	4·92
Aden Brigade	838·2	8·52	668·2	3·61
Marching	282·2	4·32	358·6	3·57
Average throughout India	823·1	5·95	614·1	4·32

Cholera.

5. Cholera caused 16 admissions and 8 deaths as compared with 23 admissions and 11 deaths in 1914. The stations at which the cases occurred were:—Nowshera (7 admissions, 3 deaths), Chakrata (6 admissions, 3 deaths), Peshawar (2 admissions, 1 death) and Lahore (1 admission, 1 death). The Officer Commanding, Station Hospital, Nowshera, states that the source of this disease was probably

a chaprassi employed in the 1st Durham Light Infantry, Khartoum Barracks, who contracted cholera on the 27th of April 1915 and died the following day. He used to get his drinking water from the well used by the troops in the barracks. The Durham Light Infantry were consequently moved into central barracks. As soon as the first case occurred in the Durham Light Infantry lines, every precaution was taken.

The Medical Officer, Station Hospital, Chakrata, states that the six cases occurring there appear to have contracted the infection from an unauthorised camp follower. The outbreak was confined to one company of 1-7th Hants Regiment occupying two barrack rooms.

SMALL-POX.

6. Only 5 cases of small-pox occurred during the year as compared with 12 in 1914. The stations from which cases were reported were Kirkee 2, Nowshera 1, Madras 1, and Deolali 1.

The following table shows the small-pox incidence for the last five years :—

Years.	Admissions.	Deaths.	No. of primary and secondary vaccinations performed.
1911	1	...	6,726
1912	17	3	8,524
1913	14	1	8,981
1914	12	...	8,107
1915	5	...	11,464

MEASLES.

7. Measles was responsible for 16 admissions with no death as compared with 23 admissions with 1 death during 1914.

MALARIA.

8. Malaria, though exhibiting a decreased prevalence, continues to be the predominating cause of inefficiency among European troops in India. It accounted for 6,934 admissions with 16 deaths in 1915 as compared with 9,862 with 10 deaths in 1914. The ratio of admissions per 1,000 of strength was 154·5 in 1915 and 162·8 in 1914.

The following table gives the admission and death rates for malaria by Divisions for the two years :—

Divisions.	Ratio per 1,000 of strength.			
	1915.*		1914.†	
	Admissions.	Deaths.	Admissions.	Deaths.
1st Division	309·2	·53	416·0	1·47
2nd Division	276·8	...	272·9	...
3rd Divisional Area	122·3	...	239·7	·14
4th Division	263·3	...	241·8	·21
5th Division	68·2	·22	150·6	...
6th Divisional Area	202·0	·91	134·4	...
7th Divisional Area	114·1	·65	99·9	·28
8th Division	53·9	·59	75·5	...
9th Division	37·4	...	56·7	·15
Burma Division	196·1	·56	67·9	...
Aden Brigade	54·5	3·41	201·1	...

*Includes figures for Territorials.
†Excludes figures for Territorials.

Among stations with a record of high malaria rates during the year were Sabathu, Port Blair, Sialkot, Khan Spur and Ghoradhaka, Kalabagh and Baragali, Cherat, Kasauli, Dum Dum, Peshawar, and Quetta.

Sabathu.—There were 156 admissions with no death at Sabathu ; 57 cases were of malignant tertian and 99 of benign tertian. All were contracted in Mesopotamia and were diagnosed by microscopic examination. Of the total admissions 26 were relapses, 6 of which were malignant tertian and 20 benign tertian.

Port Blair.—There were 303 admissions with one death. A detachment of 2-4th Somerset Light Infantry arrived here on April 2, 1915 and was quartered at the barracks on Ross Island which is considered free from anopheles. The first case occurred on May 15, 1915. On August 29 the remainder of the 2-4th Somerset Light Infantry arrived. They were quartered at Aberdeen for ten days and then divided up between Ross and Aberdeen. Accommodation was provided in barracks vacated for them by convicts. The malarial incidence rose from 2·97 in August to 35·26 per mille in December.

Malaria is prevalent in the Settlement throughout the year and particularly at Aberdeen where there are several salt-water swamps, breeding places for malaria-carrying mosquitos. Blood examinations were commenced on the 8th of August as a routine measure in every case, resulting in the discovery of—

Benign tertian parasites in	... 134 cases
Malignant tertian parasites in	... 105 cases
Quartan tertian parasites in	... 13 cases
Benign tertian and quartan mixed	... 1 case
Malignant tertian and quartan „	... 1 case
Benign tertian and malignant „ tertian	... 11 cases

There have been 47 relapses or re-infections up to date, 17 amongst benign tertian cases, 26 amongst malignant cases, 4 amongst mixed benign tertian and malignant tertian cases.

Sialkot.—Of the 565 cases of malaria 559 were of benign tertian and 6 of malignant tertian type. A very large majority were re-admissions. The diagnosis was confirmed in every case by microscopic examination of the blood. Anopheles mosquitos were found in the station from May to the end of October.

The troops paraded at the Station Hospital by companies three times a week for a prophylactic issue of quinine from July 1 to October 31. Destruction of mosquito larvæ was also carried out under the supervision of a medical officer.

Only about a fourth of the men used mosquito nets as each man purchases his own. The free issue of mosquito nets which has now been sanctioned should reduce the incidence of these fevers.

Khan Spur and Ghoradhaka.—There were 79 admissions for malaria, most of which were of the benign tertian type. Almost all these cases were relapses of cases sent up from the plains.

Kalabagh and Baragali.—The detachment of the Duke of Wellington's Infantry was largely composed of malaria cases (58) sent to the hills to recuperate.

Cherat.—There were 113 admissions (including one sick transfer from Peshawar). The diagnosis in nearly every case was confirmed by microscopical examination and infected cases were admitted to hospital. No fresh infection was contracted at Cherat.

Kasauli.—There were 122 admissions under the heading of malaria during 1915. Diagnosis was confirmed by microscopic examination of the blood in the majority of the cases. All cases were probably infected in the plains. Prophylactic measures were unnecessary as there is little, if any, indigenous malaria in Kasauli.

Dum Dum.—There were 86 admissions for malaria during the year. The majority of these cases were diagnosed clinically, as, although in every case blood smears were taken for microscopical examination, parasites were seldom discovered due most probably to the regular issue of prophylactic quinine to the troops. A fair percentage of cases were contracted by men on guard at Cossipore. All patients admitted into hospital suffering from malaria were segregated.

Peshawar.—Malaria was responsible for 667 admissions with one death during 1915. This disease continues to be the main cause of inefficiency amongst British troops in the station, but it will be noted that there is a very considerable decrease in the number of cases. The prophylactic issue of quinine and the formation of an anti-malarial brigade were the chief measures adopted. Systematic examination of the blood in all cases has been carried out. Although preventive measures have doubtless helped to reduce the incidence, yet the main cause of the decreased prevalence is to be found in the abnormally hot and dry weather experienced during the latter part of the year under report. This has prevented the formation of pools of water and lessened the amount of irrigation. The ground has remained dry and hard and unfavourable for the breeding of mosquitos.

Quetta.—There were 1,011 admissions for malaria during 1915. The diagnosis was confirmed by microscopical examination. Anophelines are found in Quetta

from the beginning of May until the end of November. Quinine was administered prophylactically in doses of 10 grains on two consecutive days in each week in the presence of a medical officer. The results of this measure were distinctly disappointing.

Enteric Fever.

9. There were 83 admissions with 16 deaths during 1915 against 97 admissions and 10 deaths in 1914. This gives an admission and death rate of 1·8 and ·36, respectively, as contrasted with 1·6 and ·17 in 1914.

The following table shows the distribution of enteric fever, paratyphoid fever "A" and paratyphoid fever "B," in the various Divisions, amongst Regulars and Territorials :—

Divisions.	Enteric Fever.		Paratyphoid "A."		Paratyphoid "B."	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1st Division ...	4	2	2	...	...	...
2nd „ ...	10	1	7	...	...	...
3rd Divisional Area...	12	...	9	...	4	...
4th Division ...	2	...	5	...	1	...
5th „ ...	22	10	15	...	1	...
6th Divisional Area...	9	1	3	...	...	...
7th „ „ ...	...	...	5	...	...	...
8th Division ...	17	2	27	...	...	...
9th „ ...	5	...	5	...	...	...
Burma „ ...	2	...	...	...	...	...
Aden Brigade ...	...	...	...	...	...	...
Marching ...	...	...	...	...	...	...
Total ...	83	16	78	...	6	...

It will be seen that the Divisions which had the largest number of cases of enteric fever reported also most cases of paratyphoid "A." The 3rd (Lahore) Divisional Area reported 4 admissions for paratyphoid "B."

The undermentioned table gives the stations which had the highest number of admissions for enteric fever (including paratyphoid fevers "A" and "B") during 1915 :—

Stations.	Strength.	Admissions including Paratyphoid "A" and "B."
Lucknow	1,320	21
Jhansi	1,088	20
Mhow	1,328	12
Dinapore	458	10
Lahore	985	9
Quetta	2,868	8
Rawalpindi	2,351	6

Lucknow.—There were 21 admissions with one death from the enteric group of fevers during 1915 (enteric, 8 admissions and one death and 13 admissions for paratyphoid "A"). The specific bacillus was isolated from all cases and the bacteriological diagnosis was confirmed by the Naini Tal Convalescent Depôt. In no case could the source of infection be traced to water, milk or any special article of food.

Jhansi.—There were 20 admissions for the enteric group of fevers, *viz.*, enteric 12 with 5 deaths, paratyphoid "A" 8 with no death. All of these except 2 cases were inoculated. In no case could the source of infection be traced.

Mhow.—There were 12 admissions for the enteric group of fevers, *viz.*, 7 paratyphoid "A" and 1 paratyphoid "B" with no death. Of the paratyphoid "A" cases the first was admitted in June; infection was probably contracted in Agra or Delhi, where he had recently been on leave, or on the railway journey. His case was peculiar as it was clinically typical of mild dengue but the organism of paratyphoid "A" was recovered from the blood taken on the fifth day of pyrexia.

One case of paratyphoid "B" was admitted to hospital on the 19th of January having arrived with his unit from England on the 4th of December 1914. In the Divisional Laboratory an organism was isolated from his blood which gave cultural reactions characteristic of *B. paratyphosus A*, but failed to agglutinate. A sub-culture was sent to Wellington, and a report received from there stated that the case was one of paratyphoid B.

No further case of this disease occurred in the battalion and investigation failed to reveal the existence of a carrier.

Dinapore.—There were 10 admissions and no death from diseases of the enteric group in 1915 as compared with 1 admission and 1 death in 1914. All these cases occurred amongst the 1·9th Battalion, Middlesex Regiment. All the cases had previously been inoculated against enteric fever, just before arriving in India, either at home or on board ship coming out. The source of infection was not traced. The cases occurred scattered throughout companies and barracks. All troops in the station were inoculated with anti-typhoid vaccine, without exception, and towards the end of the year (November and December) 280 men were voluntarily inoculated with paratyphoid "A" vaccine.

The last case of paratyphoid "A" fever must have acquired the infection in Dum Dum as he arrived in Dinapore on December 24, was detained in hospital on the 25th and admitted on the 26th of December 1915. Blood cultural examination of a specimen of his blood taken on December 30th revealed the presence of *B. paratyphosus* "*A.*"

Lahore.—There were 9 admissions from the enteric group of fevers with no death (3 enteric fever, 4 paratyphoid "A," 2 paratyphoid fever "B") during 1915. All of them had been inoculated and the cause of infection was not traceable.

Quetta.—There were 8 admissions from the enteric group of fevers. Two of them were uninoculated. There is nothing calling for special remark.

Rawalpindi.—There were 6 admissions from the enteric group of fevers, *i.e.*, 3 cases of enteric fever and 3 of paratyphoid "A." Of the 3 cases of enteric fever one was contracted in Calcutta and one at Dera Ismail Khan. The other case of enteric and one of the paratyphoid cases were contracted in the station, but the source of infection could not be traced. The other two cases of paratyphoid "A" occurred in the 1-6th East Surrey Regiment very shortly after their arrival at the station from Fyzabad. There had been no paratyphoid in Rawalpindi previous to their arrival but there had been a number of cases at Fyzabad before they left that station, so that they are believed to have contracted their infection before arrival. One case had been inoculated against enteric in October 1914 and the other in 1899.

From almost every station where enteric fever occurred the Medical Officers report that the source of origin could not be definitely traced and almost all the men affected had previously been inoculated.

Anti-Enteric Inoculation.—Anti-enteric inoculation continues to make satisfactory progress. Over 93 per cent of all European troops in India have been inoculated.

The following table shows the state of inoculation from 1st January to 30th June and from 1st July to 31st December 1915, separately:—

Arms of Service.	PERIOD ENDING 30TH JUNE 1915.						PERIOD ENDING 31ST DECEMBER 1915.					
			ENTERIC FEVER.						ENTERIC FEVER.			
			Inoculated men.		*Uninoculated men.*				*Inoculated men.*		*Uninoculated men.*	
	Number of inoculated men.	Number of uninoculated men.	Cases.	Deaths.	Cases.	Deaths.	Number of inoculated men.	Number of uninoculated men.	Cases.	Deaths.	Cases.	Deaths.
Cavalry	1,407	165	...	...	...	...	545	53	...	1	...	...
Royal Horse Artillery	277	39	...	...	...	...	141	13	...	...	...	...
Royal Field Artillery	5,085	385	11	1	6	...	3,403	159	13	...	1	...
Royal Garrison Artillery	2,182	258	2	...	2	...	2,030	258	5	...	...	...
Ammunition Column	176	9	...	...	...	...	184	4	...	...	...	...
Engineers	36	46	...	...	...	...	30	27	...	...	...	...
Infantry	30,386	1,382	45	6	7	3	27,489	1,042	62	2	6	
Garrison and Staff	1,298	680	...	...	...	...	1,167	455	4	...	2	1
Attached or unclassified troops	331	76	...	...	...	...	234	100	...	...	1	...
Totals ...	41,179	3,040	58	7	15	3	35,223	2,111	84	3	10	2
Ratios per 1,000 of strength	...	...	1·4	·17	4·9	·99	...	...	2·4	·09	4·7	·95

Of the 73 and 94 cases of enteric fever 58 and 84 cases occurred among those who were protected by inoculation and the remaining 15 and 10 were among uninoculated men during the periods ending 30th June and 31st December, respectively.

The ratios of admissions per 1,000 of inoculated and uninoculated strength during the period ending 30th June work out to 1·4 and 4·9 against 2·4 and 4·7 for the period ending 31st December 1915. The value of inoculation is clearly indicated. In the first half of the year, the 'enterica' incidence was three and a half times higher among the uninoculated men than among the inoculated and in the second period it was double that of the inoculated.

Reinoculation is urged after two years, as it is certain that the protective efficacy of inoculation is lessened after that period, and this measure is now progressing steadily.

ENTERIC CONVALESCENT DEPÔTS.

The Naini Tal and Wellington enteric convalescent Depôts perform valuable work and provide the chief line of defence against carriers.

NAINI TAL ENTERIC FEVER CONVALESCENT DEPÔT.

One hundred and eighty-five convalescents arrived at the Depôt during the year. The final diagnosis of these is shown in Table I, and the figures for 1910 to 1914 are shown for comparison.

TABLE No. I.

Years.	Convalescents in the Depôt.						
	Enteric fever.	Para-typhoid fever "A."	Para-typhoid fever "B."	Pyrexia of uncertain origin.	Mediterra-nean fever.	Other diseases.	Total.
1915	45	60	5	74	...	1	185
1914	49	60	6	78	...	2	195
1913	41	55	...	103	2	...	201
1912	89	63	4	82	...	...	238
1911	95	90	...	138	...	...	323
1910	143	27	...	...	...	...	170

These figures represent the final diagnosis of the cases and include thirteen alterations in diagnosis.

Cases of enteric fever (*45*).—Altogether forty-seven cases were diagnosed enteric fever on arrival at the Depôt. Two of these were found to be excreting paratyphoid " A " and " B " bacilli, respectively, and the diagnosis were altered accordingly (*vide* " Carriers "—Watson and Jemmett). Twenty-two were diagnosed on the isolation of the specific organism, from the blood in eighteen, the urine in one, the fæces in two, and rose-spots in one case. The remainder (23) had been diagnosed on clinical grounds only. Only one of these cases could be diagnosed with any certainty, the case of a man who had never been inoculated but who gave a marked agglutination reaction to *B. typhosus*. Two cases were almost certainly paratyphoid " A " fever and three showed no evidence of having suffered from enteric fever. Of the remaining seventeen it seems probable that seven were cases of enteric fever. These forty-five cases can be tabulated as follows :—

Proved Enteric.	Probable Enteric.	Probable Paratyphoid " A."	Doubtful Enteric.
23	7	2	13

Cases of paratyphoid " A " fever (*60*).—Sixty-seven cases arrived at the Depôt diagnosed paratyphoid " A." Eight of these were changed to pyrexia of uncertain origin in default of bacteriological confirmation and one to malaria, leaving fifty-eight. To these were added two others discovered in the Depôt originally diagnosed enteric fever and pyrexia of uncertain origin, respectively (Carriers, Watson and Jolly). All these sixty cases were confirmed by the culture of the organism, from the blood in fifty-two, the urine in four and the fæces in four cases.

Cases of paratyphoid " B " fever (*5*).—Five cases were received diagnosed paratyphoid " B." One of these, however, was not confirmed by isolation of the germ and was changed to pyrexia of uncertain origin but another case was found amongst the cases of enteric fever diagnosed clinically, so that the original number —five—remains the same.

Cases of pyrexia of uncertain origin (*74*).—Sixty-six cases were received as pyrexia of uncertain origin. One proved to be paratyphoid "A" fever ('Carrier' Jolly). As is mentioned above eight cases of paratyphoid "A" and one of paratyphoid "B" fever had to be changed to pyrexia of uncertain origin.

A careful study of serum reactions of these patients gave the following results :—

Probably Enteric.	Probably Paratyphoid "A."	Probably Paratyphoid "B."	Indeterminate.	Unclassified.
4	28	4	34	4

Other diseases (*1*).—One case originally received as a paratyphoid "A" diagnosed in error was changed to malaria.

Summary of all the cases.—The following figures indicate the nearest approach to correct diagnosis of these 185 cases as it was possible to make.

Enteric fever.	Paratyphoid fever "A."	Paratyphoid fever "B."	Belonging to Typho-Paratyphoid Group.	Unclassified.
34	89	10	47	4

TABLE No. 2.

"CARRIERS."

Serial No.	Rank and Name.	Unit.	Place and date of illness.	Diagnosed as
1	Pte. Walker, W.	1-4th Wilts ...	Delhi, 21st February 1915.	Paratyphoid "A."
2	Sergt. Jolly, H. E.	4th Queens ...	Lucknow, 25th February 1915.	Pyrexia of uncertain origin.
3	Gr. Jemmett, M.	3rd Hants, R.F.A. ...	Lahore Cantonment, 9th April 1915.	Enteric.
4	Pte. Bradley, P.	9th Middlesex ...	Dum Dum, 17th June 1915.	Paratyphoid "A."
5	Pte. Watson, W.	1st West Riding ...	Sialkot, 23rd May 1915.	Enteric.

Serial No.	Type of Carrier and Organism.	Arrived at Depôt.	How disposed of and date.
1	Fæcal B. Paratyphosus "A"	10th May 1915 ...	Returned to duty, 10th November 1915.
2	Ditto "A"	4th June 1915 ...	Returned to duty, 1st November 1915.
3	Ditto "B"	11th July 1915 ...	Still under observation.
4	Ditto "A"	17th June 1915 ...	Returned to duty, 30th November 1915.
5	Ditto "A"	30th September 1915	Still under observation

Carriers(*vide* Table 2). At the end of 1914 there remained one carrier in the Depôt, Private Searle, Welsh Regiment. He was discharged to duty on the 31st August 1915, having been free from specific germs in his excreta since the 11th December 1914.

Five carriers were discovered during the year under review.

Private Walker arrived at the Depôt on the 10th May from Meerut. His fever ran a mild typical course of sixteen days, no special symptoms were noted. A culture of the organism obtained by blood culture was received in this laboratory for confirmation as *Bacillus typhosus*. The results of the tests were somewhat atypical but on further examination the organism proved to be *B. typhosus* as the following absorption tests prove :—

(*a*) High titre typhoid serum was absorbed with Walker's strain and all the agglutinins for stock *B. typhosus* were removed.

(*b*) Walker's serum agglutinated both his own strain and stock *B. typhosus* in 1/100 dilutions.

(*c*) Walker's serum was absorbed with stock *B. typhosus* and all the agglutinins for Walker's strain were removed. On the 19th of May an organism in considerable numbers was found in his fæces and proved to be paratyphoid "A."

The agglutination tests were as follows :—

(*a*) Walker's serum reacted with stock paratyphoid "A" up to 1/50 but not in 1/100 dilutions, and to his own fæcal strain up to, but not over 1/100.

(*b*) High titre paratyphoid "A" serum was absorbed with the fæcal strain and all the agglutinins for stock paratyphoid "A" were removed. This case is, therefore, one of double infection.

Paratyphoid "A" bacilli were isolated from the fæces on the one occasion only and he was returned to duty on the 10th of November.

Sergeant Jolly arrived at the Depôt on the 4th of June from Lucknow diagnosed pyrexia of uncertain origin. His fever was of a mild remittent type lasting twenty-six days. On the 8th, 9th and 10th of June *B. paratyphosus A* was isolated from his fæces in considerable numbers. His agglutination reaction to stock paratyphoid "A" was barely complete in 1/50 but to his own strain was complete in 1/100 and partial in 1/250 dilution.

No further recovery of the bacillus was made from his fæces and he was allowed to return to duty on the 1st of November.

Grenadier Jemmett arrived at the Depôt on the 11th of July from Lahore diagnosed enteric fever on clinical grounds and on the report of the agglutination reaction. On the 10th day of disease reaction to *B. typhosus* was complete in 1/100 dilution, on the 27th in 1/250, and on the 36th in 1/500 dilutions. On the strength of this increasing reaction the diagnosis had been made.

On his arrival at the Depôt his agglutination reaction was as follows :—

Dilution	10	20	50	100	250	500	1,000
Typhoid	+	+	+	+	±	—	—
Paratyphoid "A"	—	—	—	...	...	...	...
Paratyphoid "B"	+	+	+	+	...	...	...

He had been inoculated against typhoid just six months before. On July 16 paratyphoid "B" bacilli were isolated from his stools in large numbers and again on the 22nd and 23rd of July when his first test ended. The organism was again recovered on the 30th of August, 1st and 9th of September.

During the second test (30th of August to 3rd of September) large numbers of curious gelatinous looking colonies were noticed on the plates made from his fæces, one of which was put through the tests and gave, very unexpectedly, the typical reactions of paratyphoid "B" including agglutination and absorption. This organism when first isolated gave a profuse gelatinous growth, refused to emulsify satisfactorily in normal salt on account of its sticky consistency and would not agglutinate with paratyphoid "B" serum. After keeping some days and subculturing, it lost its gelatinous appearance and agglutinated at once with paratyphoid "B" serum. In order that there should be no mistake the tests were repeated with colonies recovered on three different days.

These gelatinous colonies were recovered every day up to the 7th of October (typical paratyphoid "B" were not found after the 9th of September). This man is still under observation.

Private Bradley arrived from Dum Dum on the 28th of July diagnosed paratyphoid "A" fever as the organism had been isolated from the blood. On the 9th of August paratyphoid "A" was isolated from his fæces but this was the only occasion and he was returned to duty on the 30th of November.

Private Watson arrived from Sialkot on the 30th of September diagnosed enteric fever on clinical grounds and on agglutination reactions. Blood culture and several examinations of the urine and fæces had proved negative. On the 4th and 5th of October paratyphoid "A" bacilli were isolated from the fæces but not subsequently. He is still under observation.

Cultures for identification (*141*). One hundred and forty-one cultures were received for identification or confirmation. Tables 3 and 4 show the Divisions whence these came, the opinion expressed by the sender and the opinion formed at the Depôt.

The following organisms either did not belong to the typho-paratyphoid group, or require special mention :—

Resembling *B. typhosus.*

No. 776 was obtained from the urine and gave all the reactions of *B. typhosus*, but it turned milk alkaline, produced a yellow colour on agar and only partially absorbed agglutinins for *B. typhosus.*

Resembling *B. paratyphosus "A."*

No. 887 was recovered from the blood, was slow and atypical in growth, and did not absorb the agglutinins for either paratyphoid "A" or "B." It was agglutinated by the patient's own serum up to but not over 1/20 dilution.

No. 892 was isolated from the fæces, and except that it produced an excessive amount of acid in milk gave the reactions of paratyphoid "A." The agglutination reactions were negative.

B. paratyphosus "B" group.

No. 884 was isolated from the blood of a man in the 2-6th Gurkhas and gave all the sugar reactions of paratyphoid "B." The agglutination reactions for paratyphoid "B" and Gaertner's bacillus were negative.

No. 759 (*Foulds*) corresponded to paratyphoid "B" in the sugar tests but neither agglutinated with nor absorbed the agglutinins from either paratyphoid "A" or paratyphoid "B" serum. Further tests proved that it was not Gaertner's bacillus. The patient's serum gave the following reactions :—

	Dilutions.						
	10	20	50	100	250	500	1,000
Typhoid ...	+	+	trace	—	...	...	...
Paratyphoid "A" ...	—	—	...	...	...	...	...
Paratyphoid "B" ...	—	—	—	—	...	...	...
Own strain ...	+	+	+	+	+	—	—
Gaertner ...	trace	—	—	—			

His illness was typical of the typhoid group, the fever lasted for eleven days and was moderately severe and accompanied by some diarrhœa but no other symptoms. There is no doubt that this unnamed organism was the infecting one in this man's case.

B. fæcalis alkaligenes :—

No. 783 was sent as paratyphoid "A" isolated from the blood, but there was no doubt of its being *fæcalis alkaligenes*. It gave no reaction with the patient's own serum whereas paratyphoid "A" was agglutinated up to 1/50 dilution.

No. 818 came from the Deputy Assistant Director, Medical Services (Sanitary), Lucknow, identified as *B. fæcalis alkaligenes* and was confirmed as such. It was isolated from the blood in pure culture and was agglutinated by the patient's serum as follows :—

	Dilutions.			
	10	20	50	100
12th May	+	—	...	...
16th May	+	trace	...	...
1st June	+	+	+	+
24th September ...	—	—	—	—

The case was probably one of paratyphoid "A" fever.

No. 908 was received from the same laboratory as the previous one and proved to have been correctly identified as *B. fæcalis alkaligenes*. It was also isolated from the blood but further particulars are not yet to hand.

No. 790 was isolated from the stools and had been wrongly identified as *B. typhosus*.

Coliform organisms :

One had been isolated from the blood and was probably a contamination and eight had been recovered from the fæces.

Strains from Indians (*22*).—Twenty-one organisms were isolated from the blood and one from the fæces of Indians. These worked out as follows:—

Sender's opinion.	Number.	Confirmed as Typhoid.	Paratyphoid "A."	Fæcalis alkaligenes.	Others.	Total.
Typhoid	17	17	...	...	...	...
Paratyphoid "A" ...	4	...	3	...	1	...
Fæcalis alkaligenes ...	1	...	...	1	...	22

TABLE NO. 3.

ANALYSIS OF CULTURES RECEIVED DURING 1915, BY DIVISIONS.

Source of culture.	Opinion expressed by sender.				Our opinion.				
	Typhoid.	Paratyphoid.		No opinion.	Typhoid.	Paratyphoid.		Others.	
		"A."	"B."			"A."	"B."		
1ST (PESHAWAR) DIVISION.									
Blood	3	2	3	...	3	4	...	1	
Fæces	1	...	...	...	1	...	...	...	—9
2ND (RAWALPINDI) DIVISION.									
Blood	3	...	...	2	2	2	...	1	—5
3RD (LAHORE) DIVISIONAL AREA.									
Blood	6	2	2	...	3	5	2	...	
Fæces	2	...	...	1	...	...	1	2	
Urine	...	1	...	...	...	1	...	...	—14
4TH (QUETTA) DIVISION.									
Blood	9	9	...	...	9	8	1	...	
Fæces	3	...	...	3	1	...	...	5	—24
5TH (MHOW) DIVISION.									
Blood	19	14	...	...	19	13	...	1	
Fæces	...	1	...	...	...	...	...	1	
Urine	...	1	...	1	...	...	...	...	—36
6TH (POONA) DIVISIONAL AREA.									
Blood	...	1	...	...	...	1	...	...	
Fæces	...	...	...	1	...	...	...	1	—2
7TH (MEERUT) DIVISIONAL AREA.									
Blood	2	5	1	...	2	4	...	2	
Fæces	...	1	...	...	...	1	...	...	
Urine	1	1	...	...	...	1	...	1	—11
8TH (LUCKNOW) DIVISION.									
Blood	12	25	...	3*	12	26	...	2	—40
Total ...	...	...	...	...	...	...	...	...	141

Two diagnosed as *fæcalis alkaligenes* were confirmed as such.

TABLE No. 4.

SUMMARY OF TABLE III SHOWING CHANGE IN DIAGNOSIS.

Organisms received as		*Proved in our hands to be—*				
		Typhoid.	Paratyphoid "A."	Paratyphoid "B."	Others.	Fæcalis alkaligenes.
B. Typhosus	61	50	5	...	5	1
Paratyphoid "A"	63	1	56	2	3	1
Paratyphoid "B"	6	...	5	1	...	...
No opinion	9	...	3	1	5	...
Fæcalis alkaligenes	2	...	...	...	...	2
Total ...	141	51	69	4	13	4

Examination of the fæces and the urine.—As has been the custom, each convalescent as soon as he arrives at the Depôt is put on the "First test" which consists of ten days' consecutive examination of both the fæces and the urine. The second and third tests are carried out as soon as possible and each lasts for five consecutive days. Latterly owing to the large number of plates and the quantity of culture medium required the urine examination has been omitted from the second and third tests unless the first has proved positive. It is extremely unlikely that a "carrier" would be missed by this procedure. During the year the Endo medium has been used in preference to either Conradi-Drigalski or McConkey. A series of tests proved that the growth of the typhoid group was more rapid, more abundant and not so steadily overgrown by *coli* on the Endo, and confirmed the recent work of other observers.

The number of specimens examined was 6,254 (fæces 3,198, urine 3,056).

Agglutination reaction.—During the year 214 sera were tested against *B. typhosus*, *B. paratyphosus A* and *B. M. melitensis* and others.

With the advent of general prophylactic inoculation against enteric fever the agglutination reaction, as a test for typhoid infection, has lost a very great deal of its value. It is stated, however, that the difficulty may be overcome by estimating the end-point of agglutination on several different occasions during the course of illness. If the end-point becomes higher a specific infection of *B. typhosus* is indicated. There is a fallacy, however, in coming to such a conclusion too hastily. If the infection be due to either *B. paratyphosus* "A" or "B" the end-point for *B. typhosus* may be increased (*vide* "Carrier" Jemmett). It is not an uncommon thing for a diagnosis of enteric to be made on the alteration of the end-point alone without a control for the paratyphoids. The reaction for the paratyphoids does not yet suffer from the complication introduced by prophylactic inoculation, and as regards paratyphoid "A" fever there can be no doubt that a positive reaction to its specific organism is of the utmost diagnostic significance.

The agglutinins in this fever are apt to be transient, to appear late and disappear early. For instance, in fifty-nine cases proved by culture to be infected by *B. paratyphosus* "*A*", the following reactions were obtained on their arrival at the Depôt.

No reaction	in $\frac{1}{10}$ dilutions ...	...	in 15
Trace	$\frac{1}{10}$ ...	...	1
Complete	$\frac{1}{10}$ ...	...	7
Complete	$\frac{1}{20}$	...	10
Complete	$\frac{1}{50}$ ...	...	9
Barely complete	$\frac{1}{100}$ ...	...	5
Complete	$\frac{1}{100}$ (and over) ...	...	12
	Total	...	59

It seems certain that the great bulk of the fever obtaining amongst the British troops in India at present is paratyphoid "A" and it is possible that, were the agglutination test carried out more systematically throughout the course of the disease, much of the uncertainty regarding the diagnosis of the pyrexias of uncertain origin would be removed.

Blood Culture.—There is no doubt that blood culture is the simplest and most reliable method of diagnosis and it is noticed with regret that in many cases blood culture has not been attempted and in others has been delayed till too late.

Preventive Inoculation.—It is of interest to note the inoculation particulars of those cases conclusively proved to be enteric fever.*

Not previously inoculated (one states that he had enteric 12 years before).	...	
Inoculated two doses, within 6 months	... ...	8
" " " " 12 "	... ...	3
" " " " 18 "	... ...	1
" " " " 4 years	... ...	2
" " " " 5 "	... ...	1
No record	... ...	1
	Total ...	23

Cases according to stations.—The following table shows the stations in which the proved cases of fever were contracted.

TABLE No. 5.

Divisions.	Station	Enteric fever.	Paratyphoid fever "A."	Paratyphoid fever "B."
1st	Peshawar	2	...	...
	Nowshera	1	...	...
2nd	Rawalpindi	1	1	...
	Sialkot	...	1	...
3rd	Lahore	...	1	2
	Amritsar	...	1	...
	Ambala	...	2	1
	Kasauli	...	...	1
4th	Quetta	3	5	1
5th	Mhow	3	6*	...
	Jhansi	6	10	...
	Nasirabad	1	...	...
7th	Delhi	...	3	...
	Agra	...	2†	...
	Bareilly	...	2	...
8th	Lucknow	1‡	11	...
	Fyzabad	...	3	...
	Allahabad	...	2	...
	Dum Dum	...	3	...
	Barrackpore	...	2	...
	Dinapore	4	4	...
Burma	... ...	1	...	...
	Total ...	23	59	5

* Three cases from overseas, uncertain where contracted.
† One case probably from Jhansi.
‡ From Persian Gulf.

It would appear from this table that the distribution of enteric and paratyphoid "B" fevers, particularly the latter, is limited, while paratyphoid "A" has a much wider distribution.

Cases by units.—Sixteen regular units and thirty Territorial were represented, and there was also one Calcutta Volunteer from the East Coast of Africa. The largest number from any one regiment was 22 from the 9th Middlesex, the 1·4th Dorsets came next with 16. The following is the proportion of Regulars and Territorials:—

	Cases proved to be			Total number in the Depôt.
	Enteric.	Paratyphoid fever "A."	Paratyphoid fever "B."	
Regulars	8	11	...	37
Territorials	15	48	5	148
Total ...	23	59	5	185

Other examinations carried out in the laboratory during the year numbered 503. They included the following:—

Blood films and cultures	228
Throat Swabs	13
Water examinations	10
Various pathological specimens	60

The spirochæta of relapsing fever was found in the blood of seven Indians.

Twenty-seven vaccines were prepared from various pathological specimens.

Total number of specimens examined during the year was 7,112.

Enteric convalescent Depôt, Wellington.

Twenty-three convalescents remained over from last year.

In all 124 convalescents were admitted during the year:—

Officers	9
Warrant Officers, Indian Subordinate Medical Department ...	1
Warrant Officers and Staff Sergeants, Indian Miscellaneous List ...	3
Staff Sergeants, Indian Ordnance Department	1
Petty Officers and men, Royal Navy	6
Supply and Transport Corps	1
Indian Postal Department	1
Non-commissioned officers and men of the Regular Army ...	57
Non-commissioned officers and men, Territorial Units	45

Of this total ninety convalescents were from forces overseas, and the remaining thirty-four cases were from various stations in India.

The figures for the last three years are shown for comparison:—

Year.	Pyrexia of uncertain origin.	Paratyphoid fever "A".	Paratyphoid fever "B".	Enteric fever.	Total.
1913	32	15	...	36	83
1914	23	14	2	53	92
1915	13	33	1	77	124

The seemingly large increase in the enterica group as compared with that of previous years, is due to the cases from overseas, which form the majority of the admissions this year, being diagnosed on clinical grounds and on Widal reactions, and none being sent as pyrexia of uncertain origin.

Overseas.—Of the ninety cases from overseas, five were from East Africa and eighty-five from Mesopotamia.

East Africa.—Of these, two were petty officers of the Royal Navy, and three non-commissioned officers and men of the Regular Army. All these cases arrived diagnosed enteric fever, on clinical grounds. In the case of No. 3,928

Sergeant Jones, 2nd Loyal North Lancashire Regiment, who arrived in the Depôt on the 26th April 1915, eggs of *Ankylostomum Duodenale* were observed in his fæces on the 31st July 1915, and he was sent to the Station Hospital, Wellington, for treatment.

Mesopotamia.—The total from Mesopotamia was made up as follows : —

Officers	8
Warrant Officers, Indian Subordinate Medical Department ...	1
Warrant Officers and Staff Sergeants, Indian Miscellaneous List ...	3
Indian Postal Department	1
Petty officers and men, Royal Navy	4
Supply and Transport Corps	1
Non-commissioned officers and men, Regular Army	48
Non-commissioned officers and men, Territorial Units	19
Total ...	85

Of this number sixty-one convalescents arrived diagnosed enteric fever, all on clinical grounds and positive Widal reactions. The remaining twenty-four cases arrived as paratyphoid fever "A". In one case the organism was recovered from the blood, the remaining twenty-three cases were diagnosed on positive Widal reactions. In very few instances were any documents such as case sheets, temperature charts or medical history sheets available.

Only two carriers were detected in this number and will be referred to under the head of carriers.

Of the thirty-four cases contracted in India, eighteen came from the 9th (Secunderabad) Division, fourteen cases from the 6th (Poona) Divisional Area, one case from the 5th (Mhow) Division and one case from the Burma Division.

9th (Secunderabad) Division.—Of the eighteen cases from this Division, three were cases of enteric fever, the organism being recovered from the fæces in all three cases. Five were cases of paratyphoid " A, " the organism being recovered from blood culture in three cases and from the fæces in two. The remaining two cases were sent as pyrexia of uncertain origin.

Bangalore furnished five cases of pyrexia of uncertain origin and two cases of enteric fever. Madras sent five cases of pyrexia of uncertain origin, one case of enteric fever and one case of paratyphoid fever "A," and Wellington furnished four cases of paratyphoid fever "A." In all the ten cases of pyrexia of uncertain origin sent from this Division, a blood culture was taken and early examinations of fæces and urine were carried out with a view to isolating the causal organism, but with negative results.

6th (Poona) Divisional Area.—Of the fourteen cases from this Division, eight were sent as cases of enteric fever, all being diagnosed on clinical grounds and on Widal reactions. Three arrived as cases of paratyphoid fever " A " diagnosed on the organism being recovered from blood culture, and three were sent as cases of pyrexia of uncertain origin.

Deolali sent two cases of paratyphoid fever " A " diagnosed on the organism being recovered by blood culture, and three cases of pyrexia of uncertain origin.

In these latter cases, a blood culture was taken and the fæces and urine were examined, but with negative results. Of the two cases of paratyphoid fever "A," the organism recovered from the blood gave all the reactions of *Bacillus paratyphosus "A"*, and when absorbed with the high titre serum, it removed the agglutinins for itself and for *Bacillus paratyphosus "A"*, thus placing beyond doubt the identity of the organism.

Of the five cases that arrived in the Depôt from Kirkee, all were diagnosed enteric fever on clinical grounds and on rising Widal reactions. In three of the cases a blood culture was taken, and the fæces and urine were examined during the course of the disease, but with negative results. In two of the cases which were treated at the Station Hospital, Poona, and were sent to Kirkee prior to their being transferred to the Enteric Convalescent Depôt, no blood culture was made but the fæces and urine were examined with negative results.

Poona furnished two cases of enteric fever which were diagnosed on clinical grounds, and one case of paratyphoid fever "A" which was diagnosed by the recovery of the organism from the blood.

Colaba furnished one case of enteric fever, which was diagnosed clinically. This case contracted the illness while on boardship, between Bombay and Burma, and there were no means of applying laboratory tests in the investigation of his case.

5th (Mhow) Division.—One case of paratyphoid fever "B", diagnosed by the recovery of the organism from the blood, arrived in the Depôt from this Division.

Burma Division.—One case of enteric fever, an Officer of the Burma Police, arrived from Rangoon. He was treated in one of the Civil Hospitals there, and no documents concerning this case have been received up to date.

Carriers.—A list of these is attached. Two remained over from last year but have now both been discharged from the Enteric Depôt. Four carriers were detected during the year. One has been returned to duty and three remain in the Depôt.

The first carrier detected was Gunner Halyburton, 14th Battery, Royal Field Artillery. This case is of considerable interest in that it is one of the cases in which abscess of the liver has been caused by and directly traced to enteric fever. I therefore propose to give the history of this case in some detail.

The patient was inoculated against enteric fever in December 1913. On the 6th of August 1914, he was admitted to the Station Hospital, Secunderabad, giving a history of being ill for about one week. A blood culture was taken on the following day and *Bacillus typhosus* was isolated. On the 22nd of the same month he complained of pain over the gall bladder; it was tender on pressure and felt to be enlarged. This condition passed away in four or five days and the patient's temperature fell to normal, on the 19th of September. He was transferred to the Enteric Convalescent Depôt on the 3rd of December 1914, arriving here on the 5th of the month.

On the 29th of December 1914, he complained of pain over a small area of the liver, in the region of the gall bladder. As this condition did not improve under treatment he was admitted to the Station Hospital, Wellington, on the 31st. His temperature on the evening of his admission was 102·4 F.; differential leucocyte count showed polymorphonuclears 72 per cent., large mononuclears 9·6 per cent., small mononuclears 15·6 per cent., eosinophiles 6 per cent., and transitionals 2 per cent. On the 4th of January his urine contained neither albumen nor sugar. A blood culture taken on the same day proved sterile. On the 6th, 7th and 8th of January *Bacillus typhosus* was recovered from his fæces. On the 11th of January his temperature came down to normal morning and evening, and he was discharged to the Enteric Convalescent Depôt on the 24th of the month.

On the 31st of January he complained of pain in the right shoulder; his temperature was normal morning and evening. The next day he complained that the pain was very much aggravated at night. The liver was slightly enlarged upwards in the mid-axillary line with some bulging. His evening temperature was 99·6 F. and his blood was free from malarial parasites. He was again admitted to the Station Hospital, Wellington, on the 2nd of February 1915.

His total leucocyte count taken on the 3rd February was 10,800, and his differential leucocyte count on the same day read as follows:—Polymorphonuclears 78 per cent., large mononuclears 7 per cent., small mononuclears 11·6 per cent., eosinophiles ·4 per cent., and transitionals 1·8 per cent. There was a gradual increase in the total leucocytic count, which was taken daily, between this and the 9th of February, when it reached 27,301. The differential count which was made on the 8th instant remained much about the same. During the early morning of the 10th of February the patient expectorated what appeared to be the contents of a liver abscess. The sputum was of a brownish tinge, and on microscopical examination was found to contain numerous pus cells, diplococci, liver cells and some motile bacilli. The sputum was plated on Conradi on the morning of the 10th and on the 12th after 48 hours' incubation an almost pure culture of *B. typhosus* was obtained. On the same morning the patient was explored under chloroform, but no abscess was found. The daily amount of expectoration for the next few days averaged about six ounces. This was examined daily but with negative results. It then gradually decreased and finally ceased on the 21st of February. The patient was discharged from hospital on the 9th of March 1915.

The points of interest in this case are:—

(1) Recrudescence of cholecystitis after so long a period with normal temperature.

(2) The isolation of *Bacillus typhosus* from his fæces six months after it was isolated by blood culture.

(3) The finding of *Bacillus typhosus* and liver cells in the sputum, indicating an abscess in the liver tissue itself, a rare condition following enteric fever.

He was discharged from the Enteric Depôt on the 15th of June 1915, after 128 negative examinations of his fæces and urine.

The second carrier detected was Private Walters, 2-5th Hants Regiment, who arrived in the Depôt on the 30th July 1915, from the Station Hospital, Wellington. He was diagnosed paratyphoid fever "A" by the recovery of that organism from his fæces during the course of his illness. This organism was again recovered from his fæces while in the Depôt on the 3rd and 13th of August, since when he has not again excreted the bacillus. He still remains in the Depôt.

The third case detected was that of Private Gaskin, 2nd Norfolk Regiment, who arrived in the Depôt on the 3rd of August from Colaba. He contracted the disease while on active service in Mesopotamia and was diagnosed clinically as enteric fever. *Bacillus paratyphosus "A"* was recovered from his fæces on the 9th, 10th and 11th August, six days after his arrival in the Depôt. He still remains in the Depôt.

The last carrier detected this year was Driver Hookham, 76th Battery, Royal Field Artillery. He arrived in the Depôt on the 9th of September from Colaba, having contracted the disease while on active service in Mesopotamia. *Bacillus paratyphosus "A"* was isolated from his urine on the 23rd, 25th, 29th and 30th of October. This case is of interest in that, though the colonies on the Conradi plates presented the typical appearance of the typhoid group, and gave the sugar reactions of *Bacillus paratyphosus "A"*, it did not on any occasion agglutinate immediately with the high titre serum of any of the typhoid organisms, but did so readily with the high titre serum of *Bacillus paratyphosus "A"*, after being subcultured in sodium taurocholate or nutrient broth and then replated on a Conradi plate.

There was one case of paratyphoid fever "A" in the Depôt during the year, No. 2478 Private Faulkner, S.-1-4th Buffs, who arrived in the Depôt on the 20th of April, from Mhow, as a convalescent case of paratyphoid fever "B." He was inoculated against enteric fever in November 1914, and contracted paratyphoid fever "B" in January 1915, that organism being recovered from his blood and confirmed in this laboratory. On the 26th of June, two months after his arrival in the Depôt, he was admitted to the Station Hospital, Wellington, and found to be suffering with paratyphoid fever "A," which organism was recovered from blood culture. His admission into hospital coincided with that of three other men of the garrison, who were suffering from the same disease. In the case of these three men, the source of infection was traced, by the Deputy Assistant Director of Medical Services, (Sanitary), 9th Division, to a butler, employed in the Soldiers' Home, who was a paratyphoid fever "A" carrier. Private Faulkner, however, states that he has never been to the institute in question, all institutes outside the Enteric Depôt being out of bounds to the enteric convalescents. The only carriers in the Depôt at the time of Private Faulkner's stay, prior to his contracting the disease, were two enteric fever carriers. All carriers are isolated, having their meals apart and separate latrine accommodation.

One other case, that of Recruit Dass, 73rd Carnatic Infantry, stationed at Trichinopoly is worth mention. No blood culture was taken, and his Widal reactions were as follows :—

Ninth day of disease, negative to enteric group in all dilutions.

Twenty-third day of disease, positive in a 1 in 40 dilution, and incomplete in a 1 in 100 dilution to *Bacillus Paratyphosus "A"*, and positive in a 1 in 40 dilution to *Bacillus typhosus*.

Fifty-fourth day of disease, positive in a 1 in 200 dilution with *Bacillus typhosus*, and positive in a 1 in 100 dilution with *Bacillus paryatphosus "A."*.

On the 16th and 32nd days of disease, *Bacillus paratyphosus "A"* was recovered from his fæces, and on the 33rd and 34th days of disease *Bacillus typhosus* was recovered from his urine.

This case is of interest illustrating as it does a double infection with organisms of the enteric group.

There was a great influx of patients from July to October from the Persian Gulf, and in order that these convalescents might have the requisite number of examinations very large batches had to be examined at a time. In the course of investigating carriers this year, the method of incubating fæces and urine for twenty-four hours in peptone water with varying dilutions of brilliant green, and then plating on to Conradi, Endo's and ordinary agar plates was given an extensive trial. In this laboratory it was found that no better results are obtained in so far as the enteric group is concerned than when the routine method, *i.e.*, of incubating for half an hour before plating on to Conradi media, is employed. On the contrary the brilliant green method appears to favour the growth of *Bacillus pyocyanous*.

In all a total of 13,852 plates were examined this year. A comparative statement of the work done during each of the last three years is appended.

Year.	Arrivals.	Widal reactions.	Plates examined.	Carriers detected.
1913	83	192	6,195	8
1914	92	186	11,398	6
1915	124	195	13,352	4

It is very satisfactory to note that in the majority of cases sent to the Depôt this year from the various stations in the Southern Army, a blood culture had been made and that the fæces and urine of patients suspected of enterica, were examined with a view to isolating the causal organism.

Table showing transfers to the Depôt by stations in Divisions, including admissions from Overseas.

Divisions.	Station.	Pyrexia of uncertain origin.	Paratyphoid fever.		Enteric.	Total.
			"A."	"B."		
5th (Mhow) ...	Mhow	...	...	1	...	1
6th (Poona) ...	Poona	...	6	...	11	17
	Colaba	...	18	...	54	72
	Kirkee	...	2	...	5	7
	Deolali	3	2	...	1	6
9th (Secunderabad)	Bangalore	5	...	...	4	9
	Wellington	...	4	...	... 1	4
	Madras	5	1	...		
Burma	Rangoon	...	...	...		...
	Total ...	13	33	1	77	124

Table showing Bacteriological Examinations for the year 1915.

Month.	Urine.	Fæces.	Widals.	Organisms worked out in Depôt.		
				Enteric.	Not enteric.	Total.
January	527	527	13	3	...	3
February	407	407	5	6	...	6
March	425	425	15	5	...	5
April	351	351	12	3	1	4
May	488	488	3	...	...	...
June	488	488	3	1	1	2
July	588	588	18	3	2	5
August	601	601	29	6	1	7
September	736	736	26	...	...	...
October	812	812	21	2	...	2
November	801	801	28	...	...	...
December	517	517	22	...	...	...
Total ...	6,676	6,676	195	29	5	34

Total plates ... 13,352.

Carriers in Depôt on January 1st, 1915.

Name.	Unit.	Place and date of origin.	Period under observation.	Type of carrier.	How finally disposed of.	Division.	Disease.
Pte. Taylor ...	2-Loyal North Lancashire.	Bangalore, 29th May 1914.	10th July 1914 to 6th April 1915.	Urine B. T. A. Fæces Para. "A."	Returned to duty.	Ninth ...	Para. "A."
Pte. Ellis ...	7-Hussars ...	Bangalore, 18th July 1914.	10th September 1914 to 11th May 1915.	Urine B. T. A.	Returned to duty.	Ninth ...	Pyrexia of uncertain origin.

Carriers detected in 1915.

Gr. Halyburton ...	14-Royal Field Artillery.	Secunderabad, 31st July 1914.	5th December 1914 to 15th June 1915.	Fæces B. T. A.	Returned to duty.	Ninth ...	Enteric.
Pte. Walters ...	2-5th Hants ...	Wellington, 11th June 1915.	30th July 1915 to date.	Fæces Para, "A."	Still in Depôt.	Ninth ...	Para. "A."
Pte. Gaskin ...	2-Norfolks ...	Mesopotamia ...	3rd March 1915 to date.	Fæces Para, "A."	Still in Depôt.	Sixth ...	Enteric.
Dr. Hookham ...	76th Battery, Royal Field Artillery.	Ditto ...	9th September 1915 to date.	Urine Para. "A."	Still in Depôt.	Do.	Enteric.

The table below gives the annual admission rate per 1,000 of strength for "enterica" during each of the last 5 years in all Indian stations having an average annual strength of over 500 :—

Stations.	1911.	1912.	1913.	1914.	1915.*
Peshawar	3·0	·6	·6	3·6	2·8
Nowshera	6·4	1·9	...	1·9	1·0
Rawalpindi	·7	2·7	4·6	5·6	2·6
Gharial	...	...	1·4	...	...
Bar ia Camp	8·2	1·3	3·4	...	...
Sialkot	·8	1·9	7·9	1·8	5·7
Lahore Cantonment	4·5	3·8	1·7	3·2	9·1
Dalhousie	...	6·3	1·5	...	...
Multan	4·4	2·2	1·2	1·4	5·3
Ferozepore	1·0	...	...	...	3·6
Jullundur	...	...	...	...	...
Ambala	...	4·8	...	1·7	1·1
Dagshai	9·9	1·3	...	...	...
Meerut	1·8	3·2	1·7	7·5	...
Delhi	...	...	...	1·7	1·2
Agra	...	...	1·1	4·9	2·6
Bareilly	16·8	1·5	1·4	1·2	1·4
Ranikhet	·5	1·2	2·4	4·2	...
Chakrata	1·6	·9	1·7	...	...
Lucknow	15·4	5·5	9·3	4·4	15·0
Fort William	·8	4·8	·8	...	...
Dinapore	...	...	...	...	...
Lebong	1·6	1·6	...	...	...
Allahabad	4·2	...	...	...	2·9
Cawnpore	...	1·0	1·1	1·2	...
Fyzabad	11·6	30·6	13·3	17·4	...
Quetta	3·5	·3	1·4	2·0	2·8
Karachi	4·4	...	·8	...	...

* Includes figures for Territorials.

Stations.	1911.	1912.	1913.	1914.	1915.*
Hyderabad	1·8	...	...	...	...
Mhow	2·7	1·1	2·2	4·6	9·0
Kamptee	3·4	1·0	4·2	6·4	...
Nasirabad	6·0	4·5	2·5	...	...
Jhansi	3·2	1·0	2·8	2·0	18·4
Jubbulpore	4·8	2·7	...	...	2·8
Poona	3·0	5·3	9·2	12·1	2·3
Kirkee	5·4	·9	2·6	3·4	3·6
Bombay	3·9	1·7	2·7	4·8	2·0
Deolali	...	...	...	...	...
Ahmednagar	2·9	1·0	1·8	2·4	...
Belgaum	14·0	3·7	5·6	5·3	...
Secunderabad	4·5	5·0	1·6	3·1	·5
Bangalore	4·9	4·6	4·6	4·0	3·6
Madras	3·0	...	1·3	2·6	...
Wellington	4·3	3·4	1·0	...	5·6
Maymyo	...	...	...	...	3·9
Shwebo	...	...	...	...	...
Rangoon	·9	...	...	...	...
Aden	...	3·3	·9	·9	...

*Includes figures for Territorials.

Pyrexia of uncertain origin.

10. There were 438 admissions, with no death, returned under this head, as contrasted with 650 admissions and 3 deaths in 1914. One of the most satisfactory features of the statistics for 1915 is that the number of these cases has fallen so considerably, indicating as it probably does, a greater discrimination and care in diagnosis.

The largest number of admissions for pyrexia of uncertain origin occurred in Multan 108, Port Blair 58, Lahore 24, Rawalpindi 20, Quetta 20, Mhow 18, Chakrata 16, Barrackpore 12, Ambala 11 and Jhansi 11.

The following table shows the admission rates for pyrexia of uncertain origin and malaria in the several Divisions during the years 1914 and 1915:—

Divisions and Divisional Areas.	Admissions per 1,000 of strength.			
	Pyrexia of uncertain origin.		Malaria.	
	1914.	1915.	1914.	1915.
1st (Peshawar)	12·3	3·2	416·0	309·2
2nd (Rawalpindi)	11·8	6·5	272·9	276·8
3rd (Lahore) Divisional Area	16·1	28·4	239·7	122·3
4th (Quetta)	11·9	5·8	241·8	263·3
5th (Mhow)	4·8	7·9	150·6	68·2
6th (Poona) Divisional Area	·5	4·3	134·4	202·0
7th (Meerut) Divisional Area	2·8	6·9	99·9	114·1
8th (Lucknow)	35·0	8·5	75·5	53·9
9th (Secunderabad)	2·8	2·1	56·7	37·4
Burma	8·1	30·1	67·9	196·1
Aden Brigade	·9	...	201·1	54·5

The Multan report says that pyrexia of uncertain origin occurred chiefly during the months June, July, August, September and October. As the last hot weather was a particularly severe one in this station, and as the troops (Territorials) were new to the country it is probable that many of these were cases of sun-fever.

The prevailing character of these cases was fever with headache the duration of which was 4 or 5 days.

Scarlet Fever.

11. There were 160 cases of scarlet fever during 1915 with 2 deaths, as contrasted with only 8 cases with no death in the previous year. The disease occurred in Ambala 47 cases, Mhow 33, Bangalore 18, Quetta 14, and Multan 10. The Ambala report says that all patients had recently arrived from England. The Mhow report explains, that this disease introduced by Territorial units in the previous year, persisted through January, after which it was got under control and finally stamped out by the end of April. One case admitted on 5th May, was infected by direct contact. Many of the cases were of a very mild type with faint fugitive rashes and slight throat symptoms, which rendered recognition difficult, and hampered the efforts to control the disease. One case of a severe toxic type proved fatal. Complications were few and call for no special mention.

Sandfly Fever.

12. The number of admissions for sandfly fever was 1 844 as contrasted with 1,493 in the previous year, an increase of 351.

The greater number of cases were returned from the undermentioned stations :—

Stations.	Average annual strength.	Admissions.	Ratio of admission per 1,000	Months of maximum incidence.
Peshawar	1,803	592	328·3	May and September.
Nowshera	1,145	328	286·5	September and October.
Rawalpindi	2,271	214	94·2	May, August, September and October.
Lahore	985	94	95·4	April, May and July.
Ferozepore	832	149	179·1	May, July, August and September.
Dinapore	458	66	144·1	August and September.
Mhow	1,328	41	30·9	January, February and March.
Aden	587	60	102·2	May and June.

This disease generally is most prevalent during the hottest months of the year and occurred practically all over the country.

Plague.

13. There was one admission and one death during the year as against 3 admissions and one death in the previous year. The diagnosis was confirmed by bacteriological examination. The case was of bubonic type. The disease was contracted in the bazar.

Diphtheria.

14. There were 67 admissions for diphtheria in 1915 with 2 deaths as against 20 in the previous year. The greatest number of admissions occurred at Quetta 24 with (2 deaths), Dalhousie 15, and Wellington 8 admissions.

Dengue.

15. This disease was responsible for 696 admissions as against 646 in 1914, giving ratios of 15·5 and 10·7 per 1,000 of strength.

The stations giving the highest number of admissions were Dinapore and Mandalay 134 each, Calcutta 131, Rangoon 76 and Mhow 67.

Rabies.

16. This disease as in the previous year accounted for only one admission and one death. The man was bitten by a cat and was sent to Kasauli for anti-rabic treatment.

Beri-beri.

17. There were 21 admissions with no death for this disease as against 47 cases and 4 deaths in 1914. The ratios of strength being 47 and 78, respectively. These admissions occurred at Bangalore 7, Calcutta 6, Quetta 3, Bombay and Sabathu 2 each and Poona 1. There is nothing special to remark.

DYSENTERY.

18. The admission and death rates from dysentery were 5·6 and ·29 per 1,000 of strength in 1915 against 6·2 and ·17 in 1914. The death rate was higher in the Southern Army. The disease was most prevalent amongst troops in the Secunderabad and Lahore Divisions where the admission rates were 20·2 and 7·1, respectively. For the European Army as a whole, the months of greatest prevalence were April, July, August and September and those of least prevalence were January, March and May. There were, in all, 253 cases of dysentery with 15 deaths.

ABSCESS OF LIVER.

19. Liver abscess caused 23 admissions with 9 deaths against 29 admissions and 9 deaths in 1914. These cases occurred in the following stations :—Cherat and Meerut 3 each, Quetta and Lucknow 2 each and one case occurred in each of 12 other stations and one on the line of march.

PNEUMONIA.

20. The admission and death rates from pneumonia during 1915 were 2·7 and ·38 per 1,000 of strength, respectively, as compared with 2·8 and ·28 in 1914. The total number of admissions and deaths was 119 and 17 in 1915 and 171 and 17 in 1914. The admission rate was higher in the Southern than in the Northern Army but the death rate in the Northern was double that of the Southern Army. The following stations yielded the largest number of cases :—Quetta 14, Peshawar 13, Secunderabad 8 and Rawalpindi 7.

TUBERCLE OF LUNGS.

21. Fifty-one admissions and 5 deaths were recorded under this head as compared with 52 admissions and 10 deaths in 1914. The ratios of admissions and deaths per 1,000 of strength were 1·1 and ·11 in 1915 and ·9 and ·17 in 1914. These fifty-one cases occurred in 28 stations of which 6 were at Nasirabad and 3 each at Lucknow, Quetta, Karachi, Bombay and Madras. Two cases occurred in each of 6 stations and 16 stations reported single cases.

HEAT-STROKE AND SUN-STROKE.

22. There were 172 cases of heat-stroke with 33 deaths and 35 cases of sun-stroke with no death in the period under report, as contrasted with 58 admissions and 16 deaths for heat-stroke and 23 admissions and 6 deaths for sun-stroke in 1914. The following stations returned the highest number of cases of heat-stroke :—Jubbulpore 25 with 2 deaths, Lahore 20 with 3 deaths, Ferozepore 11 with no death.

POISONS.

23. There were 27 cases of poisoning three of which were fatal. Twenty-six were admitted to hospital with 2 deaths. The third death occurred outside hospital (carbon monoxide) and was accidental. In 1914 there were 77 cases and 6 deaths. The admissions were due to the following causes:—Ptomaine poisoning 21, chemical poisoning 2, venom of stinging insects 3.

Of the fatal cases one was due to chloroform poisoning, one to carbon monoxide and one to poisonous food (meat).

VENEREAL DISEASES.

24. The incidence of venereal diseases in the various Divisions and Aden Brigade for the past 5 years is given in the following two tables:—

All Venereal Diseases.

Ratios per 1,000 of strength.

Divisions.	1914		1915	
	Admissions.	Ratio.	Admissions.	Ratio.
1st (Peshawar)	73	21·4	117	30·8
2nd (Rawalpindi)	229	37·9	150	32·3
3rd (Lahore) Divisional Area	310	43·3	57	10·1
4th (Quetta)	203	43·1	142	33·9
5th (Mhow)	390	58·6	150	33·1
6th (Poona) Divisional Area	449	74·7	144	32·9
7th (Meerut) Divisional Area	365	51·3	170	36·7
8th (Lucknow)	490	65·7	113	22·3
9th (Secunderabad)	395	59·1	150	34·9
Burma	295	103·7	93	44·5
Aden Brigade	74	66·7	10	17·0
Troops marching	72	51·4	9	9·7

All Venereal Diseases.

Ratios per 1,000 of strength.

Divisions.	1911	1912	1913	1914	1915
1st (Peshawar)	36·0	51·6	30·1	21·4	30·8
2nd (Rawalpindi)	33·9	34·2	30·4	37·9	32·3
3rd (Lahore) Divisional Area ...	44·0	53·0	47·7	43·3	10·1
4th (Quetta)	50·0	39·1	37·2	43·1	33·9
5th (Mhow)	45·2	48·5	48·7	58·6	33·1
6th (Poona) Divisional Area	72·4	64·1	65·6	74·7	32·9
7th (Meerut) Divisional Area	49·2	48·1	43·4	51·3	36·7
8th (Lucknow)	63·7	72·7	73·5	65·7	22·3
9th (Secunderabad)	70·9	74·7	62·7	59·1	34·9
Burma	82·9	84·0	105·1	103·7	44·5
Aden Brigade	44·6	49·8	38·7	66·7	17·0
For whole of British troops ...	53·1	55·5	52·5	55·2	29·1

There were 1,305 admissions from all forms of venereal disease as compared with 3,345 in 1914, a remarkable and satisfactory decrease.

The admissions for each form of venereal disease per 1,000 of strength during each of the past two years are tabulated below :—

Year.	Syphilis.	Gonorrhœa.	Soft chancre.	All forms of venereal disease.
1914	10·4	34·6	10·2	55·2
1915	4·0	19·9	5·2	29·1

The following 15 garrisons with a strength of not less than 200 men furnished the highest number of admissions for all forms of venereal disease during the year :—

Stations.	Average strength.	Admitted.	Ratios per 1,000 of strength.
Peshawar	1,803	56	31·1
Nowshera	1,145	52	45·4
Rawalpindi	2,351	76	32·3
Sialkot	702	32	45·6
Meerut	1,190	54	45·4
Agra	757	36	47·6
Calcutta	722	36	49·9
Quetta	2,868	69	24·1
Karachi	967	50	51·7
Mhow	1,328	31	23·3
Jhansi	1,088	44	40·4
Bombay	977	55	56·3
Secunderabad	2,132	65	30·5
Bangalore	842	40	47·5
Rangoon	660	42	63·6

The incidence of venereal diseases during the last 5 years according to the arms of the service is shown in the following table :—

Years.	Venereal Diseases.	Admission ratio per 1,000.	
	Cavalry.	Artillery.	Infantry.
1911	48·9	53·8	57·3
1912	56·1	52·4	60·7
1913	38·1	46·2	59·1
1914	45·8	48·8	61·6
1915	45·4	42·5	25·3

SYPHILIS.

There was one death from syphilis returned during the year as against 4 in 1914 equivalent to death ratios per 1,000 of ·02 and ·07, respectively.

INVALIDING.

25. The total number of men invalided during the year was 889 as against 364 in 1914, giving ratios of 19·8 and 6·0 per 1,000 of strength, respectively.

Table showing the number of cases invalided to England for the more important diseases during the years 1906-15.

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Syphilis	120	76	59	26	18	10	9	13	7	6
Malaria	136	274	62	76	5	7	3	5	5	9
Valvular disease of heart and disordered action of heart	222	177	96	71	90	57	61	54	55	181
Debility	255	177	70	20	14	5	13	9	9	39
Tubercle of lung	91	106	72	65	71	55	47	49	27	43
Dysentery	59	49	31	16	9	9	9	7	3	3
Insanity	64	69	53	50	37	40	28	44	34	4
Local injuries	66	62	80	35	35	39	42	35	25	36
Rheumatic fever including gout, osteo-arthritis	40	30	27	7	4	12	14	17	5	89
Enteric fever	115	86	21	9	4	3	6*	†2	...	...
Diseases of nervous system other than epilepsy and mental	59	57	44	25	29	23	36	37	14	52
Perforation of membrana tympani	51	51	24	23	11	12	15	25	10	17
Diseases of the respiratory system	39	50	30	12	16	15	9	9	4	12
Epilepsy	42	33	36	27	25	30	24	26	20	31
Abscess of liver	67	39	31	17	14	2	5	5	7	2
Hepatitis including cirrhosis	36	21	23	4	9	4	5	5	6	6
Diseases of the eye other than amblyopia and errors of refraction.	29	29	20	16	14	12	16	20	5	32
Diseases of digestive system other than hepatitis, abscess of liver, hernia and caries of teeth.	56	41	24	11	11	14	9	13	7	40
Bilharzia hæmatobia	10	4	2	3	1	1	1	...	...	...
Diseases of the ear other than perforation of membrana tympani.	38	54	44	26	36	50	29	49	50	63
Diseases of the circulatory system other than valvular disease of heart and disordered action of heart and varix.	32	20	18	2	25	10	4	6	9	11
Hernia	15	9	10	3	2	3	1	3	1	30
Myopia, ametropia, hypermetropia, astigmatism, amblyopia and amaurosis.	23	41	20	10	19	13	6	15	5	55
Gonorrhœa	11	21	15	8	7	4	2	9	12	3
Varix	13	9	6	2	1	5	...	..	...	21
Caries of teeth	38	31	9	3	3	6	...	1	1	17
Beri-beri	60	5	5	3	2	1	...	...	...	3
Anæmia	5	7	5	1	...	1	1	1	1	...
All causes	1 091	1,786	1,074	648	562	512	474	530	364	889

* Includes 5 from paratyphoid "A."

† Both cases are of paratyphoid "A."

The following table shows the number invalided for syphilis and gonorrhœa during the last 10 years :—

Years.	INVALIDS SENT HOME.			
	Syphilis.		Gonorrhœa.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1906	120	1·71	11	·16
1907	76	1·10	21	·30
1908	59	·86	15	·22
1909	26	·36	8	·11
1910	18	·25	7	·10
1911	10	·14	4	·06
1912	9	·13	2	·03
1913	13	·18	9	·13
1914	8	·12	12	·20
1915	6	·13	3	·07

The table below contrasts the health of officers with that of non-commissioned officers and men for the last 5 years :—

Years.	RATIO PER 1,000 OF STRENGTH.					
	Admissions.		Invalids sent home.		Deaths in the Command.	
	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.	Officers.	Non-commissioned officers and men.
1911	582·1	524·7	15·78	7·07	8·10	4·89
1912	597·9	547·9	16·24	6·68	4·39	4·62
1913	545·9	580·5	14·18	7·49	2·09	3·26
1914	536·7	614·1	16·77	6·01	3·83	4·32
1915	694·2	823·1	20·19	19·80	7·31	5·95

The following table gives the incidence of "enterica" among the four groups of officers, non-commissioned officers and men, women, and children, and shows the ratio per 1,000 of strength of admissions and deaths from enteric fever, including paratyphoid fevers "A" and "B" :—

Officers.		Non-commissioned officers and men.		Women.		Children.	
Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
3·8	4·8	3·7	·36	1·3	·64	3·4	·34

OFFICERS.

26. Forty-two officers were invalided in the period under report, as compared with 35 in 1914. The causes of invaliding were :—Neurasthenia 6 ; debility 4 ; pyrexia of uncertain origin, rheumatic fever, tubercle of lungs, gunshot wound 2 each ; enteric fever, malaria, inflammation of lymphatic glands, tubercle of bladder, multiple neuritis, choroiditis, lenticular cataract, synchysis, blinding from intense light, arterial sclerosis, valvular disease of heart, disordered action of heart, Raynaud's disease, sprue, bronchitis, emphysema, duodenal ulcer, diarrhœa, calculus in kidney, inflammation of the prostate, synovitis, separation of epiphysis, concussion of brain, one each.

The average strength of commissioned officers with European troops in India during 1915 was 2,080, and among them there were 1,444 admissions with 15 deaths to hospital, as against 1,120 and 8 deaths in 1914, giving admission rates of 694·2 and 536·7 and death rates of 7·21 and 3·83, respectively. The diseases which caused most admissions to hospitals were :—diarrhœa 92, inflammation of connective tissue 75, tonsilitis 62, abrasions or contusions 61, bronchitis 59, malaria 58, sandfly fever 52, sprains and strains 51, jaundice 42, boil 37, myalgia 35, dengue 34, gastritis 33, influenza 29, otitis 28. There were 6 cases of enteric fever and 2 of paratyphoid "A," 3 of pneumonia and 3 of tubercle of lungs. The causes of deaths were fractures 3, heat-stroke 2, enteric, dysentery, apoplexy, cholecystitis, acute nephritis, chronic nephritis, contusion of abdomen with rupture of viscera, dilatation of heart, inflammation of pancreas and gunshot wound, one each.

WOMEN.

27. The average strength of women during 1915 was 1,570 as against 3,772 in the previous year. Their health was satisfactory. There were 733 admissions as contrasted with 1,819 in 1914 or a decrease of 1,086. The ratio of admissions per 1,000 of strength in 1915 was 466·9, while that of 1914 was 482·2. The diseases which caused the highest number of admissions were :—debility 206, malaria 56, bronchitis 21, tonsilitis 17, gastritis 11, inflammation connective tissue 10.

The following table gives the admission and death rates for the last 5 years :—

Year.	Ratio per 1,000 of strength.	
	Admissions.	Deaths.
1911	495·8	7·39
1912	510·5	9·16
1913	526·8	6·31
1914	482·2	6·36
1915	466·9	6·37

There were 10 deaths as compared with 24 in the previous year. The deaths were due to the following causes :—

Tubercle of the lungs 3, enteric, septicæmia, peurperal fever, carcinoma, valvular disease of heart, dilatation of heart, acute nephritis, and perimetritis, one each. The following table shows the comparative incidence among women and men in respect of the four chief groups of diseases :—

Year.	Admission rate per 1,000 of strength.							
	Enteric fever including paratyphoid.		Dysentery.		Malaria.		Pyrexia of uncertain origin.	
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.
1911	3·8	6·4	7·7	7·1	90·2	26·1	26·4	8·0
1912	2·6	7·0	5·2	5·8	82·4	22·4	21·2	10·4
1913	2·3	3·9	5·4	3·2	125·5	36·1	15·6	6·1
1914	2·9	4·0	6·2	5·3	162·8	33·1	10·7	2·4
1915	3·7	1·3	5·6	1·3	154·5	35·7	9·8	1·9

Children.

28. The average strength of European soldiers' children during 1915 was 2,925 as compared with 6,465 in the previous year. There were 998 admissions compared with 2,474 in 1914. The admission rates per 1,000 of strength were 341·2 and 382·7, respectively. The diseases which were responsible for the greatest number of admissions were measles 36, bronchitis 117, diarrhœa 80, malaria 100, debility 83, enteritis 39, tonsilitis 44 and chicken-pox 30.

The chief features in connection with the diseases are indicated in the following table :—

Year.	Admission rates per 1,000 of strength.				
	Small-pox.	Measles.	Enteric fever.	Dysentery.	Respiratory diseases.
1911	·6	66·6	4·3	5·7	31·9
1912	2·1	19·2	2·0	3·1	49·5
1913	·6	27·7	3·7	2·3	52·7
1914	·6	39·6	2·3	4·6	48·6
1915	...	12·3	3·4	4·1	46·2

There were 58 deaths as against 150 in 1914, representing mortality ratios of 19·83 and 23·20. The causes of deaths were enteritis 12, infantile convulsions 9, diarrhœa 6, premature birth 5, broncho-pneumonia 4, spinal meningitis 3,

diphtheria, colitis, and disorders of dentition 2 each and one each from 13 other different diseases.

The following table shows the mortality ratios per 1,000 among children from 1867 to 1915 at different age periods :—

Year.	Under 6 months.	Between 6 and 12 months.	From 1 to 5 years.
1867	349·8	235·3	114·9
1870	303·1	222·2	109·7
1873	330·7	298·6	104·8
1880	290·8	210·3	75·2
1885	237·1	175·2	34·1
1890	236·7	156·8	35·5
1894	250·6	142·6	31·4
1900	213·7	115·6	34·8
1906	190·6	87·9	27·5
1910	135·7	63·9	11·7
1912	142·4	72·8	20·4
1913	96·7	39·5	11·1
1914	121·4	42·8	12·6
1915	98·8	52·1	25·2

SECTION II.

INDIAN ARMY.

(From the Director, Medical Services in India.)

29. The average strength of the Indian troops including those on duty in China and other stations outside India was 119,985 as compared with 125,074 in the previous year. The annexed statement will show at a glance the general position as regards the sickness and mortality in 1915. Each rate was higher than the corresponding rate for 1914 and for the previous quinquennial period.

The following table gives a comparison between the ratios of sickness, mortality and invaliding for the quinquennial period and for the years 1915 and 1914.

Indian Troops.	All causes, ratio per mille.		
	1909-1913.	1914.	1915.
Admissions	550·4	566·5	744·4
Constantly sick	20·6	20·9	33·9
Deaths	4·69	4.17	8·55
Invalids	5·06	7·36	36·53

Admissions.

30. There were 89,315 admissions from all causes as compared with 70,858 in 1914, giving ratios of 744·4 and 566·5 per 1,000 of strength, respectively.

Deaths.

31. There were 1,026 deaths, as against 521 last year, representing death rates of 8·55 and 4·17 per 1,000 of strength, respectively.

The table below shows the death rates per 1,000 among Indian troops since 1880 compared with those of British troops in India during the same period :—

Year.	Indian Troops.		British Troops.
	Mortality excluding absent deaths based on strength present.	Mortality including absent deaths based on enrolled strength.	Death rate per 1,000.
1880	39·22	41·12	24·85
1881	19·24	22·62	16·86
1882	12·24	14·76	12·07
1883	11·76	14·31	10·88
1884	10·50	12·22	12·56
1885	13·67	16·09	14·55
1886	13·27	19·46	15·18
1887	11·68	18·17	14·20

Year.	Indian Troops.		British Troops.
	Mortality excluding absent deaths based on strength present.	Mortality including absent deaths based on enrolled strength.	Death rate per 1,000.
1888	12·84	16·14	14·84
1889	12·94	16·19	16·60
1890	15·91	18·64	13·84
1891	15·44	19·34	15·89
1892	14·97	18·67	17·07
1893	10·29	12·81	12·61
1894	10·76	13·59	16·07
1895	11·60	15·71	15·26
1896	10·20	12·57	14·84
1897	13·12	14·90	22·93
1898	11·07	13·33	20·05
1899	10·70	14·50	12·75
1900	14·04	18·57	14·62
1901	10·68	13·89	12·38
1902	11·16	15·01	14·68
1903	10·04	16·62	13·05
1904	8·46	12·08	10·83
1905	8·09	9·50	10·05
1906	6·57	8·58	10·43
1907	6·27	8·51	8·18
1908	7·41	8·49	9·78
1909	5·62	6·42	6·25
1910	4·89	7·12	4·66
1911	4·48	6·78	4·89
1912	4·42	5·66	4·62
1913	4·01	4·55	3·26
1914	4·17	3·73	4·32
1915	8·55	6·62	5·95

The chief causes of sickness in 1915 were malaria, 17,813 admissions; pyrexia of uncertain origin, 2,675; diseases of the respiratory system, 5,069; diarrhœa, 2,187; venereal diseases, 3,756; dysentery, 2,712; sandfly fever, 1,671; and anæmia and debility, 2,498. The main causes of deaths were:—pneumonia, 314; malaria, 129; enteric fever, 61; cholera, 46; respiratory diseases, 40; and tubercle of the lungs, 38. Pneumonia, which is invariably the chief cause of mortality accounted for nearly one-third

of the total deaths, while malaria came second. Hepatic affections, sandyfly fever and influenza were less prevalent amongst Indian than amongst European troops ; on the other hand, the former showed much greater proneness to pneumonia, dysentery, tubercle of lungs, pyrexia of uncertain origin and respiratory diseases.

The statistics of Indian troops located in stations outside India are given in Table XVI. The average strength of troops serving in China was 2,141, their admission rate was 488·6 and the death rate 5·60 per 1,000 of strength. It will thus be seen that on the whole there was less sickness in the China station (Hong Kong) than in India generally. Malaria, respiratory diseases, pyrexia of uncertain origin, anæmia and debility were the chief causes of sickness. There were 1,046 admissions with 12 deaths comprising five from pneumonia, two from anæmia and debility, one from enteric fever and four from other causes.

In the stations of the Aden Brigade (Aden and Khormaksar) the average strength was 587 and the admission and death rates were 1,212·9 and *nil*, respectively. The chief causes of sickness were sandfly fever and malaria.

The average strength of the stations on the Persian Gulf was 1,342 and the admission and death rates were, respectively, 1,229·2 and 14·90. The prevailing diseases were malaria, diarrhœa, dysentery, anæmia and debility. There were 20 deaths including one each from enteric fever, malaria, pyrexia of uncertain origin, pneumonia, diarrhœa, and anæmia and debility and 14 from all other causes.

The following table supplements the information given in Table XVI.

—	Average strength.	Admission rate.	Death rate.
Aden Brigade	587	1,212·9	...
Persian Gulf	1,342	1,929·2	14·90
Colombo, Diyatalawa and Singapore ...	847	674·1	1·18
Hong Kong	2,141	488·6	5·60

Northern and Southern Armies, Groups.

32. There was more sickness in the Southern than in the Northern Army, the admission rate of the former being 771·9 as compared with 740·4 in the latter. The death rate of the Southern Army was 6·52 and of the Northern Army 10·08 per 1,000 of strength. The highest admission rates were in Burma Inland, Bengal and Orissa, and Burma Coast and Bay Islands geographical groups.

Stations, Regiments.

33. There were 43 stations in India with an average strength of over 1,000, and among these the admission rates per 1,000 of strength were very high in Miranshah, Tank, Poona, Mardan, Jhelum, Loralai, Kirkee and Abbottabad and the death rates were high in Abbottabad, Miranshah, Dera Ismail Khan, Tank, Bannu, Lucknow, Delhi, Lahore Cantonment and Lansdowne. The main causes of the high admission rates were malaria, pyrexia of uncertain origin, sandfly fever and dysentery. The chief cause of the high death rate in all the stations mentioned above

was pneumonia. The following regiments showed the greatest prevalence of disease during the year; the admission and death rates are noted against each in the table given below :—

Unit.	Station.	Admission rate.	Death rate.
1-6th Gurkhas	Abbottabad ...	1,451·7	70·05
2-5th Gurkhas	Abbottabad ...	814·	52·48
1-5th Gurkhas	Campbellpore and Abbottabad.	758·7	32·72
2-6th Gurkhas	Abbottabad ...	687·1	29·54
81st Pioneers	Mardan and Nowshera.	512·6	26·29
64th Pioneers	Myitkyina and Mandalay.	1,177·1	24·31
52nd Sikhs	Bannu and Miranshah.	1,107·6	24·12

During the year 4,383 men were invalided from the service as compared with 920 in 1914. The principal causes of invaliding were anæmia and debility, venereal diseases, rheumatic fever, tubercle of the lungs and malaria.

CHOLERA.

34. There were 82 admissions with 46 deaths as against 71 and 33, respectively, in 1914. There were 80 cases in the Northern and 2 cases in the Southern Army. The most considerable outbreak occurred at Nowshera where 29 cases with 8 deaths were reported from two regiments. The disease broke out in May and September in the 81st Pioneers and the 46th Punjabis. All precautionary measures were taken and the disease was promptly brought under control.

The cause of the outbreak could not be definitely traced.

SMALL-POX.

35. The number of admissions for small-pox was 31 with no death as compared with 32 with one death in the previous year. In no regiment did the disease appear in epidemic form, the largest number in any one station being 3. The 31 cases were spread over 19 stations.

ENTERIC FEVER.

36. There was an increased prevalence of enteric fever among Indian troops as compared with 1914. Admissions numbered 258 as compared with 202; and the number of deaths was 61 as compared with 41. The cases were scattered over 58

stations. Those stations which suffered most severely were:—Bannu—49 admissions and 10 deaths; Miranshah—41 admissions and 10 deaths; Kohat—18 admissions and 2 deaths; Sialkot and Muscat with 11 cases and 1 death each. The following units suffered most severely: 30 cases with 6 deaths in the 52nd Sikhs, 20 cases with 8 deaths in the 10th Jats, 18 cases with 2 deaths in the 26th Punjabis, 15 cases with 3 deaths in the 2-4th Gurkha Rifles, and 14 cases with 1 death in the 1-16th Mahrattas. The source of infection, as is usual amongst Indian troops, could not be definitely traced, but appears to have been attributable to the easy access to foul water. The disease was most prevalent in the summer months of the year when flies and dust may have been partly responsible for its spread.

The diagnosis of most of the cases of enteric fever was confirmed by blood culture or Widals' test, and urine and fæces were also examined when necessary.

It will be seen from the accompanying table that Gurkhas usually show a greater predisposition to this disease than other Indian and British troops.

Years.	ENTERIC FEVER. RATIO PER 1,000.					
	British Troops.		Indian Troops.		Gurkhas.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1909	8·9	1·58	2·2	·43	5·1	·95
1910	4·6	·63	2·5	·44	6·1	1·07
1911	3·8	·33	2·3	·42	5·2	1·22
1912	2·6	·39	1·8	·47	33	·84
1913	2·3	·25	1·6	·23	2·9	·50
1914	2·9	·21	1·6	·33	4·0	·82
1915	3·7	·36	2·2	·51	2·4	·65

The Senior Medical Officer, Kohat, states that in March a Dogra sepoy admitted in the hospital was found to be suffering from enteric fever. The Gurkhas occupied the Chamberlain Lines. In April two more cases occurred in the same lines—one Dogra and one Gurkha, who had recently come to the station. In all 6 cases of typhoid and 12 cases of paratyphoid were admitted during the year under report. The disease was confined to the sepoys living in the Chamberlain Lines. Much time was spent in investigating the origin of the disease. The water from the stream and bathing tank, the milk, meat and fish, from the lines to which the disease was confined, were examined without result. The cooks, bunniahs, sweepers and others were brought to hospital, and their stools were examined and cultured in the usual way. After many days' hard work two typhoid carriers were found in the lines, one a sweet-seller and the other a butcher. These men were isolated, and all other possible precautions were taken to prevent the spread of the disease.

Anti-enteric inoculation.—This preventive measure continues to make fair progress among Indian troops. In some regiments practically all the men of the battalion were inoculated. The exact figures as to the number of men inoculated against enteric fever during the year are not available, owing to withdrawal of regiments for field service and their repeated movements from one station to another.

MALARIA.

37. There were 17,813 admissions and 129 deaths as compared with 14,114 cases and 29 deaths in 1914. This represents an admission rate of 148·5 per 1,000 of strength and a death rate of 1·08 as compared with 112·8 and ·23 in 1914. The increase was due to the increased prevalence of the disease in the Northern Army.

The highest admission rates (in stations where the average strength was over 200) were reported from Muscat (1,654·2), Hangu (630·6), Shillong (618·3), Myitkyina (508·6), Miranshah (474·4), Abbottabad (436·2), Tank (434·3) and Thayetmyo (432·6).

Muscat.—There were 1,459 admissions with one death as against 501 and no death in 1914. A scrutiny of the meteorological records seems to show that although Muscat is situated in the sub-tropical zone, its temperature conditions are those associated with a tropical climate. Active breeding by anophelines has been proved to take place practically throughout the year and since the atmospheric temperature rarely falls below 60° F., it may be assumed that, so far as temperature conditions are concerned, infection and reinfection may be acquired at all seasons of the year.

Hangu.—There were 321 admissions from malaria in the year under report. The land in the neighbourhood of the Hangu Camp is heavily irrigated, which affords many suitable breeding grounds for mosquitos. Quinine was issued as a prophylactic, in doses of ten grains of the sulphate in solution, from May to November 1915.

Shillong.—Admissions 452 (Gurkhas 70 and 123rd Rifles 382) against 361 last year (Gurkha Rifles 165 and 123rd Rifles 196). The disease was confined to men returning from recruiting duties and recruits coming from the depôt of the 123rd Rifles at Mhow. Almost all cases were of the benign tertian variety.

Myitkyina.—Admissions 177 with 6 deaths as against 350 with 3 deaths during 1914. Owing to non-receipt of 'medical transactions' from Myitkyina there is nothing special to remark.

Miranshah.—Cases 611, deaths 8. The units that suffered most were :—

10th Jats, 200 cases, 4 deaths; 52nd Sikhs, 146 cases, 2 deaths; 116th Mahrattas, 134 cases and no death; 25th Cavalry, 44 cases, 1 death; 29th Mountain Battery, 41 cases, 1 death; 26th Punjabis, 41 cases, no death; Frontier Garrison Artillery, 5 cases, no death. The Jats and the 52nd Sikhs suffered much in previous years from malaria, the former in Hyderabad and Jhansi, and the latter in the Bannu Brigade; but the 116th had practically no malaria the year before, and comparatively little in 1913, both years in Jhansi. All the three corps most affected had occupied camps or outposts in the Tochi

Valley and elsewhere, which are notoriously malarious, but Miranshah appears to have been the worst station. Most cases were mild, but severe and persistent cases, with temperatures running up to 105°, accompanied by delirium and with subsequent debility, were frequent. Practically all cases of pyrexia had their blood microscopically examined one or more times. Benign tertian parasites were most frequent but malignant tertian were also found. There was at least one quartan case, in the 116th Mahrattas.

Abbottabad.—Malaria was very prevalent throughout the autumn. The number of admissions during the year was 1,416. The figure though large does not give a true estimate of the extent of the disease, and the degree to which it permeated all ranks. As many cases could not be admitted to the overcrowded hospital, they had to be treated in special segregation camps. The Gurkha battalions in particular suffered severely from this disease. In all severe cases, blood smears were examined microscopically but parasites were not found in as large a proportion of cases as might be expected.

Malaria accounted for 60 deaths. Invalid and segregation camps were established to endeavour to prevent the spread of the epidemic and to hasten the recovery of those affected. Quinine was given intramuscularly and intravenously but with doubtful benefit. Sulphate of quinine was administered as a prophylactic in 10 grain doses on two consecutive days each week and afterwards, during September and October, it was administered in 5 grain doses daily. At first all cases of malaria were treated in a special ward under mosquito curtains, but as the epidemic assumed larger proportions the malaria cases overflowed into every ward and filled each tent.

Tank.—There were 720 admissions from malaria as compared with 282 in 1914. Prophylactic issue of quinine was adopted during the hot weather.

Thayetmyo.—Malaria was the most prevalent disease among the sepoys, especially among the Pioneers. There were 152 cases and 2 deaths among the 64th Pioneers and 29 cases among the 91st Punjabis. This high figure is due to the Pioneers having been in a malarious area before they arrived in Thayetmyo. They were on road construction duty in the jungle in Myitkyina and were more or less saturated with malaria before their arrival.

Malignant tertian and benign tertian parasites were found in a fair number of cases. They had been getting quinine and so it was difficult to find parasites in all the cases. Most cases yielded to quinine, but some were rather obstinate in their course. These yielded to arsenic and quinine internally with hypodermic injections of quinine. The Pioneers were put on prophylactic quinine in ten grain doses four times a week. The Punjabis and Carnatics were on quinine on two consecutive days in the week for part of the year. This prophylactic quinine had a decided effect in checking the disease.

PYREXIA OF UNCERTAIN ORIGIN.

38. There were 2,675 admissions for pyrexia of uncertain origin with 26 deaths as against 4,436 and 15, respectively, in 1914. The highest number of admissions occurred in the following stations:—Jhelum (353), Tank (320), Rawalpindi (277), Fort William (173), Peshawar (150), and Lahore Cantonment (133).

The units with the largest number of admissions were :—The 16th Rajputs, consisting of a large percentage of recruits and reservists, had 183 admissions and were stationed at Fort William throughout the year. The disease known in Calcutta as " 3 days' fever " was the cause of the large number of admissions under this heading. As it is not recognised in the official nomenclature the cases of fever of 3 days' and 5 days' duration, were all designated pyrexia of uncertain origin. The signs and symptoms of these cases showed a great resemblance to a mild form of influenza. The occurrence of this fever in the months of July, August, September and October exhibits a seasonal prevalence in Calcutta similar to that of dengue.

The 97th Infantry at Tank and Dera Ismail Khan had 155 admissions with one death. The 87th Punjabis at Tank and Zam and the 84th Punjabis at Rawalpindi had 141 and 131 admissions, respectively.

SANDFLY FEVER.

39. There were 1,671 cases of sandfly fever as against 1,483 in 1914. The disease was reported from 33 stations and the largest number of admissions occurred in :—Miranshah 323, Bannu 258, Peshawar 237, Aden 179, Kohat 125, Mardan 113, Kila Drosh 104. The disease is in itself not of great importance but it lowers the resisting power and vitality of the sufferers and thus complicates any concomitant disease.

The units which suffered most were :—The 116th Mahrattas at Bannu and Miranshah who admitted 361 cases in all. They did not appear to suffer notably in Bannu, but got sharp attacks on arrival in Miranshah. Previous attacks conferred no immunity ; on the contrary they seemed to render certain individuals more liable to subsequent attacks.

Although no fatality resulted from sandfly fever, some cases, especially in the autumn, gave cause for anxiety—high temperatures, diarrhœa, epistaxis, prostration and collapse having to be carefully combated. Most cases were of the three day type but some with more prolonged temperature (4 to 7 days) were observed.

The 109th Infantry at Aden admitted 161 cases. As the result of an extraordinary amount of rain in the winter, a succulent green plant covered what are usually the very barren hills of Aden. Coincidentally with this the place became infested with the sandfly to an extent unknown in previous years. This resulted in a large outbreak of three days' sandfly fever with typical symptoms of frontal headache, pain and injection of eyes, and body pains. There was no rash discoverable on the bodies of Indians. This fever occurred chiefly in the early months January, February and March. The plague of sandflies became so severe at one time that sleep at night became nearly impossible.

The 21st Punjabis at Peshawar had 135 admissions. All the cases occurred during the hot months. The disease was most prevalent during May and June and disappeared in the cold weather.

The Queen Victoria's Own Corps of Guides at Mardan accounted for 113 admissions from sandfly fever against one in 1914.

The 2-1st Gurkhas at Drosh and Chitral admitted 115 cases during 1915.

DENGUE.

40. There were 181 cases attributed to dengue as against 544 last year. Only 16 cases occurred in the Northern Army; the rest of the cases were recorded in the Southern Army. The disease was reported from 14 stations, the largest number of admissions occurring in the following stations:—Thayetmyo 89, Trichinopoly 39, Rangoon 12, Mandalay 9. The Medical Officer, Thayetmyo, states that no parasites were found in the blood. The cases ran a temperature from 3 to 7 days, with pain in the joints and frontal headache. Most of the cases had a slow pulse in proportion to the temperature. A few had a rash on the chest: quinine had no effect on the disease.

MALTA FEVER.

41. There were only 32 admissions of Malta fever with one death as compared with 32 cases and no death during the previous year. The unit which had the largest number of admissions was the 45th Sikhs at Dera Ismail Khan who reported 23 cases. About a third of this number were admitted in January. The type of the disease was severe. Most of the patients were ineffective throughout the year. Relapses were common. There was one death, and two men were invalided. The medical officer attributes the outbreak to the ease with which goats' milk was obtainable and the preference of the men for drinking it unboiled. Every effort was made in the regiment to cut off the supply of unboiled goats' milk.

KALA-AZAR.

42. There were 8 cases of this disease with 4 deaths as in the previous year. The disease was reported from the following 6 stations:—Abbottabad and Dehra Dun 2 each, Ambala, Dinapore, Quetta and Deoli one each.

RELAPSING FEVER.

43. There was a marked decrease in the incidence of relapsing fever. The total number of admissions during the year was only 3 with 2 deaths as compared with 41 admissions and one death last year.

BERI-BERI.

44. Admissions for beri-beri rose from 7 in 1914 to 59 in the year under report; 26 of the cases occurred at Trichinopoly, 13 at Baroda, 8 at Bangalore, 5 at Thayetmyo, 3 at Mandalay, and 2 cases each at Secunderabad and Bannu.

PLAGUE.

45. There were 24 admissions on account of plague with 8 deaths as against 13 admissions and 7 deaths in 1914. In only one unit, the 5th Cavalry at Rawalpindi, did the disease threaten to become epidemic, 10 cases with one death having occurred in that regiment. The disease was reported from 13 stations.

SCURVY.

46. This disease accounted for 238 admissions and 5 deaths as compared with 81 admissions and 2 deaths in 1914. The largest number of admissions were repoted from Jandola 83, Karachi 30, Chaman 17, Ahmednagar 16 and Tank 15.

The 83 cases that occurred in Jandola were admitted into hospital during the last two weeks of the year. The occurrence of such a large number of cases in an outpost with a strength of 138 men and within a very short period of two weeks, must not be taken to mean that scurvy broke out suddenly here. The first weekly inspection was held and 34 men were noticed as suffering from scurvy 12 of whom said they contracted the disease at Jandola. During the next weekly inspection 49 more cases were recognized of which there were only 5 whose disease originated at Jandola. The remaining cases, 66 in all, were among men who had been transferred here from other outposts. The rations of the sepoys were defective though in other respects they live under very good hygenic conditions, having enough exercise and fresh air, and with nothing to depress their vitality. To make good the defect in the rations one ounce lime juice is issued thrice a week.

TUBERCLE OF THE LUNGS.

47. There were 332 admissions with 38 deaths attributed to tubercle of the lungs as compared with 270 and 29 in 1914. This disease continues to be one of the prominent causes of mortality and invaliding in the Indian Army. The stations which suffered most were :—Dehra Dun, 23 admissions with 7 deaths; Peshawar, 23 admissions with 2 deaths; Jhelum, 23 admissions with no death; Abbottabad, 21 admissions with one death; Bareilly, 17 admissions, Mardan, 14 admissions; and Bannu, 13 admissions.

The largest number of admissions to hospital in any regiment during the year was 12 in the 1-2nd Gurkhas at Dehra Dun. The next largest numbers in individual regiments were 9 in the 2-5th Gurkhas at Abbottabad and 7 in 1-6th Gurkhas at Abbottabad and Campbellpore.

It will be seen from the table given below that the Gurkha shows a much greater predisposition to this disease than other Indian troops. The admissions and deaths amongst Gurkhas numbered 61 and 21, respectively, during the year under report.

TUBERCLE OF THE LUNGS. RATIO PER 1,000.

Year.	Army of India.		Gurkhas.		Excluding Gurkhas.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
1906	2·5	·52	5·2	2·41	2·2	·29
1907	2·5	·33	4·8	1·03	2·3	·24
1908	3·0	·42	5·0	1·43	2·7	·28
1909	2·3	·39	4·0	1·34	2·1	·26
1910	2·4	·19	3·6	·50	2·3	·15
1911	2·1	·21	3·6	·70	1·9	·14
1912	2·0	·24	4·1	·84	1·7	·16
1913	1·8	·24	2·7	·94	1·6	·15
1914	2·2	·23	4·5	1·02	1·8	·13
1915	2·8	·32	4·4	1·51	2·6	·16

PNEUMONIA.

48. This disease accounted for 1,547 admissions and 314 deaths as against 910 admissions and 136 deaths in 1914. For many years this disease has been the chief cause of mortality amongst Indian troops. The stations principally affected were Bannu (112 cases and 23 deaths), Peshawar (89 cases and 16 deaths), Quetta (68 cases and 21 deaths), Kohat (58 cases and 7 deaths), Rawalpindi (53 cases and 12 deaths), Dehra Dun (49 cases and 3 deaths), Dera Ismail Khan (47 cases and 19 deaths), Jullundur (46 cases and 4 deaths) and Tank (44 cases and 10 deaths). The units which suffered most were the 10th Jats and the 52nd Sikhs (both at Bannu and Miranshah) 55 and 41 cases, respectively; the Queen Victoria's Own Corps of Guides at Mardan 39 cases; the 30th Punjabis at Delhi and Tank (31); the 2-9th Gurkha Rifles at Dehra Dun and Delhi (28); and the 97th Infantry at Dera Ismail Khan and Khajuri Kutch (25).

The disease was less prevalent than in the previous year in only two of the geographical groups, and the highest admission rates for the year were recorded in the North-Western Rajputana group (18·7 per 1,000) and the Upper Sub-Himalayas (16·0 per 1,000).

The pneumonia admission and death rates of the Northern Army were nearly double those of the Southern Army.

DYSENTERY.

49. There were 2,712 admissions with 24 deaths from dysentery as contrasted with 1,781 admissions and 10 deaths in 1914. The highest admission rates were reported from Miranshah, Tank, Shillong, Alipore, Thayetmyo, Bannu and Santa Cruz, the admission rates in these stations varying between 250·8 and 52·1 per 1,000. As regards the prevalence of the disease in regiments, 174 and 114 cases occurred in the 10th Jats and the 52nd Sikhs, respectively, (both stationed at Miranshah and Bannu) and 110 cases in the 87th Punjabis at Tank and Zam.

Dysentery prevailed most extensively in Miranshah (323 cases). The form of the disease appears to have been mostly bacillary, some medical officers believing that only about 4 per cent. were amœbic, but heavy work prevented systematic microscopic examination of cases.

COLITIS.

50. There has been an increase of 382 cases and one death in the figures for colitis during the year under review, the number of admissions being 1,213 with 3 deaths as against 831 with 2 deaths in 1914.

The stations showing the greatest number of admissions were Peshawar 130, Nowshera 99, Mhow 88, and Kirkee 80.

VENEREAL DISEASES.

51. During 1915 there were 3,756 admissions and 4 deaths amongst Indian troops as compared with 1,945 admissions and 4 deaths in the previous year. The ratios per 1,000 of strength were 31·3 for admissions and ·03 for deaths as against 15·6 and ·03 for 1914. As has been noted the Southern Army suffers more from such

diseases than does the Northern Army. The highest number of cases were reported from :—Jhelum 167 admissions, Peshawar 150, Poona 141, Secunderabad 139, Ambala 136, Dehra Dun and Karachi 121 each, Bangalore 113, Quetta 112 and Rawalpindi 107.

The statement below contrasts the admission rates from venereal diseases among Indian and European troops.

Year.	Venereal Diseases admission rate per 1,000.	
	Indian Troops.	European Troops.
1906	16·2	117·3
1907	14·7	89·9
1908	15·2	69·6
1909	16·4	67·8
1910	16·9	58·9
1911	14·9	53·1
1912	14·4	55·5
1913	12·6	52·5
1914	15·6	55·2
1915	31·3	29·1

Suicide.

52. The total number of suicides during 1915 was 15 as compared with 10 in 1914. Of these 6 were by gunshot, four by hanging, two by opium poisoning, one by drowning, one by jumping out of a railway carriage and one probably suicidal (exact cause unknown).

Guinea-worm Disease.

53. Guinea-worm was responsible for 643 admissions as compared with 256 in 1914. The following stations returned the highest number of admissions :—Ferozepore 63 admissions, Bannu 59, Dacca 58, Jhelum and Poona 42 each, Lahore Cantonment and Belgaum 27 each, and Kirkee 20. The Medical Officer, Bannu, states that most of the cases occurred in the 116th Mahrattas. The infection must have been contracted at their homes in the Deccan where the disease is common and where dirty water from pools and tanks is used indiscriminately for drinking purposes.

Ankylostomiasis.

54. There were 41 admissions with one death ascribed to ankylostomiasis. The highest number of cases occurred in the Malakand and Fort Lockhart stations (10 cases each).

Commissioned British Officers.

55. The average annual strength of British commissioned officers with Indian troops during 1915 was 1,349. The total admissions from all causes among them were 809 with 13 deaths as compared with 631 and 10 deaths in 1914.

The principal causes of admissions were :—malaria 132, sandfly fever 53, pyrexia of uncertain origin 37, diarrhœa 29, and dysentery 20. There were 12 admissions with 5 deaths from enteric fever among British officers attached to Indian troops. The admission and death rates from enteric fever as compared with officers with British troops were in the year under report :—British officers attached to Indian troops admission rate 8·9, death rate 3·71 per mille; British officers with British troops, admission rate 3·8, death rate 0·48.

SECTION III.

GENERAL POPULATION.

AGRICULTURAL CONDITIONS.

56. The year 1915 opened with an absence of famine conditions. The cold weather rains were plentiful in January and February over the greater part of the country. The hot weather rains in March—May were also in excess. The monsoon current, on which so much depends, was late in becoming established; north-west India had but little rain till the end of August when matters improved and much needed rain fell in September and the first half of October. The total rainfall of the period June—September was in defect over most of northern India but above normal in the Peninsula. A small area in Bengal and Bihar and Orissa was visited by drought. The rainfall from October to December was either normal, or in excess of normal, in most parts of the country. The total rainfall of the year was two per cent in excess of normal on the plains of India.

The total outturn of wheat was 6·7* per cent in excess of the quinquennial average and was a record one. The seasonal conditions were everywhere favourable for this crop except in Bengal and Bihar and Orissa where, however, the wheat crop is not of much importance. Conditions were not so favourable to the rice crop which fell short of the previous year's outturn by 2·9 per cent. Sugarcane had a decreased acreage but in spite of this the yield was higher than in the previous year and in excess of the quinquennial average. The oilseed crops did fairly well.

BIRTHS AND DEATHS.

57. Below is given in tabular form the total number of births and deaths registered in each administration in India in the year under report:—

Province.	Births.			Total deaths.			Ratio of deaths per 1,000 of population.			Mean death rate during previous five years.		
	Total number.	Ratio per 1,000 of population.	Mean ratio during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.
Delhi	19,969	47·91	...	7,703	4,368	12,071	34·16	22·85	28·97	...	...	...
Bengal	1,441,628	31·80	34·53	71,836	1,416,731	1,488,567	24·70	33·39	32·83	24·06	29·69	29·33
Bihar and Orissa	1,396,805	40·4	41·9	36,074	1,075,851	1,111,925	30·9	32·2	32·2	30·2	31·6	31·5
Assam	203,336	33·60	32·39	3,586	183,192	186,778	30·02	30·88	30·86	21·46	26·28	26·18
United Provinces of Agra and Oudh.	2,036,121	43·48	44·56	127,535	1,279,208	1,406,743	41·24	29·22	30·04	42·19	35·93	36·37
Punjab	843,012	43·6	44·9	63,174	639,376	702,550	36·17	36·35	36·33	34·97	30·88	31·25
North-West Frontier Province...	64,764	31·7	35·3	5,395	42,799	48,194	28·21	23·14	23·61	25·15	24·37	24·44
Central Provinces and Berar ...	667,340	47·95	50·75	56,603	443,079	499,682	44·29	35·06	35·91	41·25	37·46	37·77
Madras Presidency	1,249,434	31·2	32·1	126,869	753,081	879,950	26·2	21·4	22·0	28·5	23·1	23·7
Coorg	4,433	25·33	26·44	445	4,993	5,438	44·58	30·26	31·08	54·22	34·35	35·49
Bombay Presidency... ...	726,780	37·10	36·14	96,261	415,352	511,613	30·28	25·31	26·12	32·78	28·97	29·99
Burma { Lower ...	204,822	33·39	32·69	25,392	128,695	154,087	32·62	24·03	25·12	35·65	22·79	24·48
Burma { Upper ...	141,428	38·01	35·36	16,092	105,670	121,762	50·23	31·07	32·72	41·84	26·74	28·11
Ajmer-Merwara	21,953	43·78	44·61	Not available		13,052	Not available		26·03	Not available		36·86
British India	9,021,825	37·82	39·20	636,965	6,492,395	7,142,412	32·15	29·75	29·94	33·43	30·45	30·70

The birth rate for British India as a whole was 37·82 per mille which is 1·8 less than in 1914 and 1·4 lower than the quinquennial mean. The Central Provinces returned the highest rate 47·95 per mille, closely followed by Delhi, 47·91. Among the major provinces the birth rate was lowest in Madras 31·2, the North-West Frontier Province 31·7 and Bengal 31·8. With the exception of Assam and Upper Burma, all administrations reported lower birth rates in 1915 than in the preceding year. The death rate exceeded the birth rate in Bengal and, as usual, in the small province of Coorg. Everywhere else the natural increase of population was considerable, greatest in Delhi, Ajmer-Merwara, the United Provinces, the Central Provinces and Bombay where the excess of births over deaths amounted to 18·95, 17·7, 13·4, 12 and 11·0 per mille, respectively. In Assam the births exceededthe deaths by only 2·8 per mille.

The death rate for British India as a whole amounted to 29·94 per mille which is ·06 lower than in the previous year and 0·76 lower than the quinquennial mean. The lowest death rate, 22 per mille, was, as usual, recorded in Madras. The North-West Frontier Province takes second place with 23·61. The Punjab returned the highest death rate, 36·33 per mille closely followed by the Central Provinces with 35·91. The Punjab, Bengal, Burma, Bihar and Orissa, and Assam all had increased death rates as compared with the previous year: the remaining seven administrations returned lower rates. Most noteworthy is the fall in the death rate of Delhi Province from 37·98 in 1914 to 28·97 per mille in the year under report. The Assam death rate was 6·2 per mille in excess of that of 1914.

The urban death rate for India as a whole was 32·15 per mille as compared with 29·75 the rural rate. Both rates are lower than the quinquennial means.

Chief Diseases.

58. Below are tabulated the number of deaths ascribed to each of six important causes of mortality :—

Province.	Cholera.		Small-pox.		Plague.		Fevers.		Dysentery and Diarrhœa.		Respiratory diseases.		All other causes.	
	Total deaths.	Ratio per 1,000.	Total deaths.	Rat io per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
Delhi	92	·22	14	·03	8	·01	6,716	16·11	266	·63	3,644	8·74	1,331	3·18
Bengal	130,679	2·88	32,785	·72	199	·004	1,064,159	23·47	28,919	·63	11,733	·25	220,093	4·86
Bihar and Orissa ...	88,349	2·5	15,526	·4	27,241	·7	696,839	20·2	32,940	·9	6,975	·2	244,055	7·1
Assam	26,979	4·46	4,076	·67	...	...	91,739	15·16	16,122	2·66	4,732	·78	43,130	7·13
United Provinces of Agra and Oudh.	90,508	1·93	2,304	·05	58,128	1·24	957,299	20·44	19,477	·41	24,236	·52	254,791	5·44
Punjab	13,196	·68	1,694	·09	221,966	11·48	284,784	14·73	12,558	·65	47,193	2·44	121,159	6·27
North-West Frontier Province.	932	·45	26	·01	340	·17	36,518	17·89	482	·24	1,601	·78	8,295	4·06
Central Provinces and Berar.	5,662	·41	1,151	·08	20,264	1·46	237,834	17·09	46,122	3·31	44,155	3·17	144,494	10·38
Madras Presidency ...	30,098	·8	24,038	·6	3,889	·1	290,228	7·3	61,057	1·5	41,113	1·0	429,527	10·7
Coorg	...	...	23	·13	2	·01	4,549	26·00	105	·60	44	·25	715	4·09
Bombay Presidency ...	377	·02	1,425	·07	43,824	2·24	224,797	11·48	31,707	1·62	63,364	3·23	146,119	7·46
Burma ... { Lower	8,209	1·34	202	·03	2,891	·47	50,554	8·24	8,159	1·33	5,405	·88	78,667	12·82
Burma ... { Upper	9,388	2·52	15	·00	1,749	·47	33,086	9·05	3,427	·92	3,124	·84	70,373	18·91
Ajmer-Merwara ...	3	·01	3	·01	...	...	10,585	21·11	459	·92	402	·80	1,600	3·19
British India { 1915 ...	404,472	1·70	83,282	·35	380,501	1·60	3,990,287	16·73	261,800	1·10	257,721	1·08	1,764,349	7·40
British India { 1914 ...	280,730	1·18	76,590	·32	266,588	1·12	4,092,345	17·16	278,225	1·17	261,149	1·09	1,900,144	7·97

Cholera.—Cholera was more prevalent than in any year since 1912. The increase chiefly affected Bengal, Bihar and Orissa, Assam, the United Provinces, and Burma. Madras, Bombay, and the Central Provinces had a markedly decreased incidence as compared with the previous year. Assam was the chief sufferer: here cholera was responsible for a death rate of 4·46 per mille. This is a higher cholera death rate than has been reported by any administration for very many years and is more than three times the death rate from cholera returned by British India as a whole. Bengal 2·88, Upper Burma 2·52, Bihar and Orissa 2·5, and the United Provinces 1·93 come next. With the exception of Lower Burma, 1·34, all the other administrations returned cholera death rates below one per mille. Coorg had no cholera at all and Bombay's mortality from cholera amounted to ·02 per mille, a remarkably low figure representing as it does only 377 deaths throughout the year.

Small-pox.—Small-pox was responsible for 83,282 deaths which represents a rate of 0·35 per mille. This figure closely approximates the normal: the mean small-pox death rate for the previous quinquennium was 0·32. Bengal and Bihar and Orissa were responsible for more than half the small-pox of India. Bengal was the chief sufferer and had a death rate of 0·72 per mille. The North-West Frontier Province returned only 26 deaths and Upper Burma, with 15 deaths, was likewise almost free from this disease. Vaccination in India is considered in Section V of this report.

Plague.—Plague had an increased mortality as compared with the previous year being responsible for a death rate of 1·6 per mille as compared with 1·12 in 1914, 0·83 in 1913, 1·10 in 1912, and 3·07 in 1911. The Punjab was by far the worst infected province, in fact 58 per cent of the total plague deaths of British India were reported from the Punjab. The Punjab plague deaths amounted to 11·5 per mille. Bombay came second with 2·24. The Central Provinces and the United Provinces returned plague mortality rates of 1·5 and 1·2, respectively. In no other province did the rate approach unity. Assam and Ajmer-Merwara were quite free from the disease. In Bengal, Delhi, Coorg and the North-West Frontier Province plague was almost a negligible factor in the vital statistics in the year under report. The outstanding features of the epidemics will be considered in more detail when the various provinces are receiving separate consideration. The Punjab, United Provinces and Bombay excepted, India suffered but little from the ravages of plague in 1915. In British India taken as a whole plague was a less important cause of mortality than was cholera.

Fevers.—Once more, more than half the total deaths in India were ascribed to "fevers," a comprehensive term that includes a multitude of diverse complaints. The "fever" death rate in British India amounted to 16·73 per mille as compared with 17·16 in 1914. This figure remains about the same year after year: during the last five years the lowest rate reported is 16·5 and the highest 17·5. In the year under report the larger administrations returned fever death rates ranging from 7·3 per mille in Madras to 23·47 in Bengal. That is to say, 71 per cent of the total deaths of Bengal were ascribed to "fever" whereas only 33 per cent were so ascribed in Madras. Year after year in this report emphasis has been laid on the fact that it is quite impossible in the present state of our knowledge to hazard even an intelligent guess as to the proportion of fever deaths that are rightly attributable, either directly or indirectly, to malaria, in the various administrations of India. We will revert to this topic again later on. The Government of India are very fully

alive to the urgent need for improvement in the methods of registration of vital statistics now in vogue. The matter would ere this have received a good deal of the attention that it deserves had it not been for the disorganization that has inevitably resulted from the war.

Dysentery and diarrhœa.—Dysentery and diarrhœa were responsible for a death rate of 1·1 per mille, an almost exactly similar figure to that returned for the previous year. The mortality rate attributed to these conditions is also remarkably constant year after year. The highest rate returned in 1915 was 3·3 per mille in the Central Provinces and the lowest 0·24 in the North-West Frontier Province. Nine of the fourteen provinces returned a rate below one per mille.

Respiratory diseases.—Respiratory disease is another heterogeneous assortment of pathological conditions about which it is not possible to make any dogmatic assertions. As a cause of mortality it generally approximates in importance the group "dysentery and diarrhœa" that we have just discussed. In Bengal and Bihar and Orissa, and generally in the United Provinces, "respiratory disease" is a very unimportant item in the vital statistics. In the Central Provinces, Bombay and the Punjab, on the other hand, it is by no means a negligible factor. In the year under report it was the cause of a death rate of 8·7 in Delhi Province, of 3·2 in Bombay and the Central Provinces, of 2·4 in the Punjab, and one per mille in Madras. All the other administrations returned rates of less than unity. One cannot escape the conviction that the apparent geographical distribution of the pathological conditions, that should be included under this head, are in large part due to the varying methods of registration of vital statistics that are in force in the different provinces.

Delhi.

59. The province of Delhi has a population of 416,656 of which only 191,185 dwell in rural areas. The vital statistics of this province can therefore hardly be compared with those of other Indian provinces in which so relatively small a proportion live in towns. The health of the province was good. The birth rate was 47·9 per mille and the death rate 29 to which it fell from 38 in 1914, a most remarkable decrease. There were 105 male births recorded for every hundred female.

December was the month of maximum mortality, when the deaths reported were more than twice as numerous as in February, the healthiest month. No infectious disease gave rise to anxiety, there being only 92 deaths from cholera, 14 from small-pox and 8 from plague.

In Delhi City the infantile mortality rate showed a remarkable decrease. The infantile death rates for the past three years are:—1913, 346; 1914, 313; 1915, 249 per thousand births. The attention that has been paid to the sanitation of Delhi City during the last few years has already resulted in a most notable improvement in health conditions.

Bengal.

60. The rainfall in the year under report was above normal in twenty of the twenty-seven districts; it was irregularly distributed however, and the agricultural outturn was below normal in the majority of the districts.

The provincial birth rate declined from 33·8 in 1914 to 31·8, a figure which is nearly 3 per mille below the mean of the previous quinquennium. The birth rate varied in districts between 18·5 in Calcutta and 43 in Noakhali. The rural birth

rate was as usual much in excess of the urban rate. There were 107 male births for every hundred female.

A still further rise in the death rate from 31·57 to 32·83 per mille, which is 3·5 above the quinquennial mean, was recorded in 1915. Thus the recorded death rate exceeded the birth rate by one per mille. The district death rate was lowest in Tippera, 22·77, and highest in Murshidabad, 45·21. The urban death rate was 24·7 per mille, an exactly similar figure to that for 1914: the rural rate was 33·4 against 32 in the previous year. While the urban rate varies but little year after year, the rural rate in 1915 was 3·7 higher than the mean of the previous five years. The male death rate was one per mille in excess of the female rate.

Once again, November and December were the months of greatest mortality. In each of these months more than twice as many deaths were reported as in July, the month when fewest deaths occurred. The onset of the cold weather in Bengal is generally accompanied by an increased mortality.

The infantile mortality for the province amounted to 219 per thousand births against 221 in the previous year. The rates for the two sexes were, 224 for male infants, 213 for female.

Cholera.—Cholera was more than usually prevalent and was responsible for a death rate of 2·88 per mille, the highest rate recorded during the last five years. No district was free from this disease; the district cholera death rates varied between 0·8 in Darjeeling and 5·9 in Mymensingh. The latter district was responsible for 26,662 deaths of the total 130,679. As long as the majority of the water supplies are unprotected, as they are at present, severe outbreaks of this disease must be expected. The throwing of bodies of patients, dead of cholera, into rivers that are the sources of supply of drinking water, is a practice that was reported from the two worst infected districts and must have been attended with most disastrous results. The disease was most prevalent in the months of April, November and December. The distribution of the disease illustrates the importance of a pure water supply as a preventive of this disease.

Small-pox.—Small-pox was likewise very much more prevalent than in the previous year; it caused a death rate of 0·7 per mille against 0·2 in 1914. This rate is the highest recorded since 1909. Calcutta was severely stricken and acted as a distributing centre of infection to surrounding districts. Vaccination is still unsatisfactory in Eastern Bengal; this matter is now receiving some of the attention it deserves. March to May was the season of maximum small-pox incidence. Certain districts escaped lightly; Jalpaiguri came off best with a death rate of ·01 per mille; 24-Parganas suffered most and returned a small-pox mortality rate of 2·9. Of the total deaths from this disease 14 per cent occurred among children under ten years of age. This is a smaller percentage than usual and is of good omen.

Plague.—Plague caused only 199 deaths, all but eight of which were reported from Calcutta. In Calcutta itself 1915 was the mildest plague year since this disease gained a foothold.

Fever.—"Fever" accounted for 71 per cent of the total recorded deaths in Bengal in 1915; to it was ascribed a death rate of 23·5 per mille against 23·4 in 1914 and 21·1 the mean rate of the preceding quinquennium. The district of Birbhum recorded a "fever" mortality rate of 39·7 per mille; its death rate from all causes was but 44·5. The urban "fever" death rate was 7·9 and the rural rate was 24·5.

Quinine was distributed gratuitously in the worst malaria infected districts during the fever season. The question of the prevalence of malaria in Bengal has of late attracted a very large amount of attention. The problems connected with the prevention of malaria in Bengal are attended with very special difficulties and more research work is urgently required.

Dysentery and diarrhœa.—Dysentery and diarrhœa caused a death rate of 0·63 per mille : the urban rate, 2·68, was in excess of the rural rate 0·5. Fewer deaths were ascribed to these diseases than in the two previous years but the death rate is somewhat higher than the previous quinquennial mean.

City of Calcutta.

61. The weather conditions in 1915 deviated but little from the normal. Somewhat higher temperatures were recorded and the rainfall in March was excessive.

It is unsatisfactory to note that the birth rate in the City of Calcutta has been declining for the past five years and the rate recorded in the year under report, 18·5 per mille, is the lowest for the past 10 years. The death rate 28·5 per mille approximates that for 1914, 28·3 per mille : it is slightly lower than the quinquennial average, 28·6 per mille.

The City of Calcutta was singularly free from plague during the year, there being only 191 deaths recorded. A severe epidemic of small-pox was responsible for 2,560 deaths. The outbreak of cholera which caused 1,612 deaths was the mildest recorded for many years. Malaria accounted for 1,258 deaths, approximating the average for the past five years. It is satisfactory to note that there was a marked diminution in the mortality from respiratory diseases, tubercle, dysentery and diarrhœa, and enteric fever.

Port of Calcutta.

62. During the year 1,125 vessels with 97,691 crew and passengers were examined. In addition 10,881 cargo boats were inspected. There were 15 cases of small-pox and 7 of chicken-pox on out-going vessels : 3,651 persons were vaccinated. Four ships had beri-beri cases on board. There were no cases of sleeping sickness or jigger and only one case of cholera.

Assam.

63. The year 1915 was an unhealthy one. Very heavy and extensive floods occurred in the month of July in Sylhet and Cachar, which resulted in scarcity and the consumption of unusual diet : this, at a time when climatic conditions were very unfavourable, was largely responsible for increased sickness and mortality rates.

The provincial birth rate rose from 32·9 in 1914 to 33·6, which is 1·2 per mille over the mean rate for the previous five years. The rate varied in districts between 30·2 in Lakhimpur and 39·7 in Goalpara. The urban rate was 29·8 while the rural rate was 33·7. There were 106 male births reported for every hundred female.

The death rate rose from 24·66 in 1914 to 30·86 in the year under report : the mean rate of the previous five years is 26·18. Among districts Kamrup reported the lowest rate, 25·4, and Goalpara the highest, 40·9. The urban and rural death rates were approximately equal. November was the most unhealthy month when the death rate was more than double that of March, the month in which fewest deaths occurred. The birth rate exceeded the death rate by 2·7 per mille.

Verification of vital statistics by the vaccination staff resulted in a detection of omissions to report births and deaths amounting to 12·8 and 8·9 per cent of the respective totals.

The infantile mortality rate amounted to 202 per thousand births.

All the chief causes of mortality were responsible for higher death rates than normal.

Cholera.—The death rate from cholera rose from 1·5 in 1914 to 4·5 per mille. The mean rate for the previous decade was 2·7. The floods that occurred in July, to which reference has been made, followed by high temperatures and absence of rain in October and December, produced very favourable conditions for the spread of this disease. When the habits of the people and the unprotected nature of the majority of the water supplies are taken into consideration, little more is required to explain the spread of communicable diseases of this nature.

Fevers.—To "fevers" was attributed a death rate of 15·2 per mille, that is to say rather fewer than half the total deaths reported from all causes. It is not possible to frame an approximation as to what percentage of these "fever" deaths are rightly attributable to malaria. An increased number of quinine "treatments" were sold during the year.

Kala-azar.—Kala-azar caused 1,233 deaths, 65 fewer than in the previous year. Only in the Nowgong and Kamrup districts were more deaths reported than in 1914. The disease appears to be stationary in most of the endemic centres.

During the year sanction was accorded to the creation of a separate post of Sanitary Commissioner for Assam : previously the duties of that post had devolved upon the Inspector-General of Civil Hospitals.

Bihar and Orissa.

64. Climatic conditions in this province were not favourable in the year under report. The rainfall was in defect, and, moreover, was badly distributed, resulting in damage to crops both by drought and flood. These facts probably in part explain the fact that the vital statistics for the year reveal a somewhat less satisfactory state of health conditions than those prevailing in 1914.

The birth rate fell from 42·3 in 1914 to 40·4 per mille. The mean rate for the previous five years is 41·9. There was considerable variation in the district rates ; the highest, 48·1, was recorded in Palamau, and the lowest, 31·7, in Singhbhum. The urban birth rate was nearly 9 per mille below the provincial rate. One hundred and five male births were recorded for every hundred female. The birth rate exceeded the death rate by 8·2 per mille.

The death rate which had fallen to 28·3 in 1914 rose to 32·2 per mille which is 0·7 per mille higher than the previous quinquennial mean. The district rate was highest in Balasore, 44·2, and lowest in Singhbhum, 21. The infantile mortality rate was 185·9 per thousand births. Only Bombay and the North-West Frontier Province returned a lower infantile death rate than this in the year under report. More deaths were reported in November than in any other month ; November's deaths were 80 per cent in excess of those reported in either January or February, the two healthiest months. Certain improvements have been effected in the registration of vital statistics during the year ; it is too early yet to report on the results achieved.

Cholera.—Cholera was much more prevalent than in the previous year and was responsible for a death rate of 2·5 as compared with 0·9. The former figure closely approximates the mean cholera death rate for the previous ten years. No district was completely free from the disease ; the Shahabad district suffered most, returning a cholera death rate of 5·4 per mille. The disease was most prevalent in the months of November, October and August. Floods appeared to have played a part of importance in the causation of outbreaks.

Small-pox.—Small-pox exacted a toll of 0·4 per mille of the population which is double the rate for the preceding year. No district was free : Balasore had the highest rate, 1·2. Four-fifths of the deaths occurred in the first half of the year.

Fevers.—To " fevers " were attributed 63 per cent of the total mortality of the province. It can be safely assumed that malaria was responsible for but a relatively small proportion of these 'fever' deaths : badly malaria stricken localities are not numerous in this province. What the chief pathological conditions are that account for the balance of the fever mortality, it is not possible to surmise. In Puri the fever mortality was only 7·2. In the other districts rates varying between 12 and 28 were recorded. The delivery of popular lectures on malaria, the distribution of quinine, and the employment of travelling dispensaries were the chief of the means adopted in the campaign against malaria.

Plague.—Plague was responsible for 27,241 deaths, 0·7 per mille. This is considerably less than half the plague mortality recorded in 1914. Excluding 1908 and 1909 the plague epidemic in the year under report was the mildest experienced during the last decade. As usual the outbreak reached its height in the month of March. Once again the districts of Patna, Saran, Shahabad and Gaya, districts which abut on the United Provinces district of Ballia, were responsible for the majority of deaths. The Orissa and the Chota Nagpur Divisions were again practically free from the disease and the Bhagalpur Division suffered but slightly. The geographical distribution and the seasonal prevalence of plague in this Province remain remarkably constant year after year. In the Patna and the Tirhut Divisions, which are the only two that suffer appreciably from plague, the disease is characterized more by the comparative ease with which infection manages to survive the adverse conditions of the hot weather than by the severity of individual outbreaks : these have never been of similar severity to the severe epidemics that have afflicted the Punjab and the western districts of the United Provinces from time to time.

No other disease calls for special comment.

United Provinces of Agra and Oudh.

65. The birth rate declined from 44·9 per mille in 1914 to 43·5 in the year under report which is one per mille below the mean of the previous five years. In districts the birth rates varied between 25·4 in Dehra Dun and 49·2 in Bijnor. Though the provincial birth rate has been falling during the last three years, the birth rate in municipalities has been steadily rising; in 1915 the urban birth rate was 44·8 per mille, the highest ever recorded. In 1915 the urban birth rate in the United Provinces was in excess of the rural rate, an unusual state of affairs in India. The excess of births over deaths amounted to 13·4 per mille which is a greater natural increase of population than was recorded in any other of the major

provinces of India in the year under review. There were 108·7 male births recorded for every hundred female: this proportion remains fairly constant in these provinces.

The provincial death rate fell from 33·46 in 1914 to 30 per mille, which is 6·3 below the mean of the previous quinquennium. Only four of the major provinces had lower death rates than this. The district rates varied between 19 per mille in Banda and 52·97 in Pilibhit. The urban death rate was 41·24 which is twelve per mille in excess of the rural rate. The infantile mortality rate works out at 205 per thousand births as compared with 233·5 in 1914. This reduced rate is a gratifying feature of the vital statistics for 1915: only once has a lower rate been recorded in these provinces and that was as long ago as 1893. It would appear that the increased attention that has been paid during recent years to this important matter is bearing fruit. The training of *dhais*, the activities of travelling dispensaries, attention to the milk supplies of towns, anti-malaria measures and propagandism, can with justice claim some part in the attainment of this reduced infant mortality rate. A study of the district and municipal figures suggest that malaria and deficient attention to conservancy are potent causes of high infant death rates.

Cholera.—Cholera was responsible for 90,508 deaths (1·9 per mille) which is nearly three times the mortality that was attributed to this disease in the previous year. The pilgrims returning from the Kumbh fair at Hardwar were important agents in the spread of infection. More than half the total deaths occurred in October and November; in the former month the deaths totalled 26,615. January and February were almost free from the disease. Hamirpur and Banda were the only two districts that were completely free; Meerut and Jhansi were very lightly affected. The two severest outbreaks were experienced in the districts of Garhwal and Pilibhit where the cholera death rates for the year were 11·5 and 11·2 per mille, respectively. The former occurred in the hot weather, the latter in the autumn. Almora had a death rate of 9·7; in no other district did the mortality rate attain 6 per mille.

Small-pox.—There was a very marked decrease in the incidence of small-pox; only 2,304 deaths were attributed to this cause as against 17,954 in 1914. Only two of the major provinces had a lower small-pox mortality than this. In only three towns in the province did the number of small-pox deaths exceed ten.

Plague.—Plague was not severe; a death rate of 1·2 per mille was attributed to it which is one per mille less than in the previous year. As usual the months of March and April witnessed by far the greatest number of plague deaths: in these two months alone approximately sixty per cent of the year's mortality occurred. Once again the districts in the east of the province bore the brunt of the disease; this is always the case in years of moderate plague severity for reasons that were discussed in last year's report. In the year under report the Benares and Gorakhpur Divisions contributed considerably more than half of the total plague mortality of the province. Once again the Jhansi and Kumaun Divisions were free from the disease. The west of the province came off comparatively lightly and at the end of the year was all but plague free. Plague in the eastern districts was once more characterized by the persistence with which infection survived the adverse conditions of the non-epidemic season.

Fevers.—To 'fever' was ascribed a death rate of 20·4 per mille which is 2 per mille lower than the rate for the preceding year and the lowest recorded since 1893. Monthly variations in the numbers of fever deaths reported was not as marked as one would premise, were the majority of fever deaths directly caused by malaria; the fact that December was the month of maximum mortality, however, is perhaps explicable on a malaria hypothesis. Anti-malaria measures attracted a considerable amount of attention; amongst them school quininization was perhaps productive of most good.

No other disease calls for special comment.

PUNJAB.

66. On the whole the year was a healthy one. Abnormally heavy rain fell in March which is the month in which plague epidemics in this part of India are approaching their height, and this heavy rain may have played some part in determining the severe nature of the outbreak in the year under report. The monsoon rainfall, on the other hand, was in marked defect with the result that malaria was less in evidence than in an average year. The price of food grains was high throughout the year.

The birth rate fell from 46·3 in 1914 to 43·6 per mille (mean of the previous five years, 44·9). The district rates were lowest in Simla, 21·3, and Dera Ghazi Khan, 31·1, and highest in Rohtak, 51·3. The urban rate was 43·4 which closely approximates the provincial average. There were 109·7 male births reported for every hundred female.

The death rate rose from 32 to 36·3 per mille (mean of the previous five years, 31·3). This increased mortality rate was entirely accounted for by the severity of the plague epidemic without which 1915 would have been an extremely healthy year. Rawalpindi returned the highest district rate, 57·4, and Dera Ghazi Khan the lowest 19 per mille. The urban mortality rate, 36, closely approximated the rural rate and the provincial average. April, May and March were by far the most unhealthy months. Deaths in these three months, which were chiefly due to plague, amounted to 42 per cent of the total mortality for the year. September was the month with fewest deaths; it had a mortality rate less than a third of that of April. The infant mortality rate showed a welcome decrease; it amounted to 188 per thousand births for males and 189 for females, as compared with 209 and 211, respectively, in 1914. The birth rate exceeded the death rate by 7·3 per mille—a low figure for this province.

Cholera.—Cholera was more prevalent than in any year since 1903: it caused 13,196 deaths (0·68 per mille). The part played by the Kumbh fair at Hardwar in the dissemination of cholera infection in the United Provinces has already been referred to; in the Punjab this fair seems to have played an even more definite part in the spread of this disease. It is very significant that the year 1903 was the date of the previous Kumbh fair. Cholera was practically absent from the Punjab during the first three months of the year but in April pilgrims returning from Hardwar spread the infection far and wide and during the next six months most districts suffered more or less severely. The disease was most virulent in the Ferozepore and the Lahore districts which reported mortality rates of 3·1 and 2·6 per mille, respectively. In only three other districts did the rate exceed unity. No death from cholera was reported in December from any

district. More than half the total deaths occurred in the months of May and June. The history of the outbreak demonstrates very clearly the importance of large fairs in the matter of spread of cholera and such like communicable disease.

Small-pox.—A still further decrease in the prevalence of small-pox was recorded in 1915; the very low mortality rate of ·09 per mille was attributed to it. This is a tribute to the satisfactory state of vaccination in the province.

Plague.—The year under report witnessed the most severe outbreak of plague since the terrible epidemic of 1907. To it were ascribed 221,966 deaths, 11·48 per mille: a figure approximately double the combined plague mortality of the three previous years. Only three epidemics in the Punjab have been more severe than this. Early and heavy winter rains towards the close of 1914 combined with widespread infection combined to make conditions very favourable for plague. Further heavy rains in March and the beginning of April, with the consequent retarding of the hot weather, made a severe outbreak almost inevitable. Of the twenty-eight districts three enjoyed their usual immunity from the disease, *viz.*, Simla, Dera Ghazi Khan and Mianwali. Three other districts, Kangra, Muzaffargarh and Multan suffered but very slightly. The remaining 22 districts had epidemics of varying degrees of severity. The brunt of the disease fell on the Rawalpindi Division; the Lahore Division, which usually suffers most, came second. Gujrat district had a plague mortality rate of 36 per mille, Rawalpindi 28·6, and Jhelum 27·4. Four other districts had plague death rates over twenty, and five between ten and twenty, per thousand. Once again the epidemic reached its height in the month of April; the seasonal prevalence of the disease in the Punjab is remarkably constant. By the end of the year the disease had almost disappeared from the province which fact accompanied by the comparative failure of the early winter rains made the prospects for a very mild epidemic in 1916 very bright.

Malaria.—Malaria was but little in evidence. Deaths, ascribed to 'fever', amounted to 14·7 per mille compared with 17·9 in 1914. 'Fever' deaths were most numerous in the two coldest months of the year.

Had it not been for the severity of plague, 1915 would have been an abnormally healthy year in the Punjab.

North-West Frontier Province.

67. The birth rate fell from 32·7 in 1914 to 31·7 per mille in the year under report which is 3·6 below the mean rate of the previous five years. This is the lowest provincial birth rate reported in India in the year under report. The district rate varied between 26·6 in Peshawar and 38·3 in Dera Ismail Khan. There were 125·5 male births reported for every hundred female, an even higher proportion than in 1914. It is almost impossible to accept these figures as representative of fact: such an extreme variation in the sex ratio is never witnessed in other provinces of India. The deduction that is forced on one is that the registration of vital statistics is in a more backward condition in this province than in any other part of India.

The reported death rate amounted to 23·6 per mille which is 2·2 below the figure for 1914 and 0·8 below the quinquennial mean. With the single exception of Madras this is the lowest death rate reported from any province in 1915. The district rate was highest, 29·8, in Hazara and lowest, 19·2, in Peshawar. The urban rate 28·2 was five per mille in excess of the rural rate. The number of deaths

reported in December, the month of maximum mortality, was more than double the number reported in April the month of fewest deaths. The birth rate exceeded the death rate by eight per mille. The reported infantile death rate was 166 per thousand births, a low rate for India and probably much lower than it would be were vital occurrences more accurately reported.

Cholera was but little prevalent : 932 deaths were ascribed to this cause. Only 26 deaths were attributed to *small-pox* ; all but two of these occurred in the Peshawar district. *Plague* caused 340 deaths.

Fevers.—'Fevers' caused a death rate of 17·9 per mille ; when the total death rate, 23·6 per mille, is recalled, the hopelessness of any attempt at drawing deductions from such figures, becomes apparent. The year under report was not distinguished by severity of malaria.

Central Provinces and Berar.

68. On the whole, meteorological conditions were favourable in the Central Provinces during 1915. Though the monsoon began late and the rain it yielded was somewhat in defect, plentiful rain in September and October was most beneficial to crops. The rice outturn was 17 per cent in excess of normal and wheat and jowar did well. In spite of such favourable conditions the year was not a healthy one.

The provincial birth rate fell from 51·37 to 47·95 per mille, a figure 2·8 below the mean of the previous five years. The district rates varied between 43 and 53 per mille. All the districts save two reported lower rates than in the previous year. In spite of this decrease the birth rate was higher than that recorded by any other province in India. There were 104·6 male births recorded for every hundred female.

The death rate amounted to 35·9 per mille which is ·78 lower than the 1914 rate and 1·86 below the quinquennial mean. Only one other province, the Punjab, returned a higher rate than this in the year under report. There was very considerable variation between the rates recorded in districts ; the district rate was lowest, 26, in Mandla, and highest, 44·5, in Nagpur. The urban death rate was 44·3 per mille which is 9·2 higher than the rural rate. October was the month of greatest mortality when the number of deaths was almost double the number recorded in July, the healthiest month. The infant mortality rate was 259·7 per thousand births which is lower by four per mille than the 1914 rate. More than half of the total deaths of the province occurred among children under five years of age. This reveals a most serious state of affairs. The importance of the matter is fully realized by the local authorities who are giving the matter earnest attention. The constant seasonal prevalence that the curve illustrating infantile mortality in the Central Provinces exhibits, is of considerable interest : most infant deaths occur in the hot months of May and June, and fewest in the first three months of the year.

Cholera.—The cholera death rate fell from 1·46 per mille in 1914 to 0·41 ; this rate is well below the mean of the previous five years. Nine of the twenty-two districts were practically free from the disease. Bilaspur, Drug and Jubbulpore were the three worst infected districts ; in them the cholera mortality amounted to 1·44, 1·39, and 1·27 per mille, respectively. In no other district did the rate approach unity. The monsoon months July to October witnessed most deaths. Yet once more pilgrims returning from pilgrimages played an important part in the spread of infection.

Small-pox.—Small-pox was very little in evidence: only 1,151 deaths were ascribed to it. (·08 per mille). The increased attention paid to vaccination that has been evidenced in recent years is bearing fruit.

Fevers.—To 'fevers' was ascribed a death rate of 17 per mille. Though this figure conveys but little, in the present state of our knowledge, it is a fact that malaria was unduly prevalent in the year under report. Quinine vendors reported greatly increased sales. No extensive anti-malaria measures were undertaken during the year.

Plague.—Plague was relatively severe and was responsible for a death rate of 1·46 per mille. More deaths occurred in February than in any other month, a somewhat unusual circumstance. The urban plague mortality rate amounted to 10·16 per mille as opposed to 0·58 the rural rate. Nagpur was far and away the worst affected district returning a plague death rate of 10·68 per mille. Seoni came next with 4·3. Six other districts had death rates above one per mille. The seasonal prevalence of plague in the Central Provinces presents some points of interest. In the southern Deccan, and in the south of India generally, the monsoon type of epidemic most commonly occurs; that is to say the outbreak starts with the advent of the monsoon and reaches its height in the month of October. In the north of India the cold weather type prevails, the height of the outbreaks occurring in March or April. Epidemics in the Central Provinces may adhere to either of these two types; sometimes they are intermediate between the two.

MADRAS.

69. Favourable climatic conditions in Madras in 1915 resulted in slightly lower prices for all the staple food-grains than those prevailing in the previous year: the prices were, however, still above the average.

The birth rate was 31·2 per mille, 2·3 below the rate for 1914 and one per mille lower than the mean of the previous five years. No other of the major provinces reported so low a birth rate as this in the year under report. District variations were considerable; the rate was lowest in Ramnad, 21·9, and highest in Guntur, 37·6. The urban rate was 30·5 per mille which approximates the provincial rate. There were 104·5 male births reported for every hundred female.

The provincial death rate, 22 per mille, is very appreciably lower than the rate reported from any other administration. It is 3 per mille lower than the 1914 rate and 1·7 lower than the quinquennial mean. Twenty-three of the 25 districts returned lower rates than in the preceding year. District death rates varied between 15·5 in Ramnad and 36·4 in Madras. The urban death rate was 26·2 which is nearly five per mille in excess of the rural rate. January was the month of maximum mortality while June reported fewest deaths, but the monthly variations in the death rate were much less marked than in the majority of Indian provinces, a fact which indicates the absence of any severe epidemics. The infantile death rate was 186·6 per thousand births which is nearly ten per mille below the rate reported in 1914. Forty per cent of the total deaths occurred among children under five years of age.

Cholera.—Cholera was responsible for 30,098 deaths which is less than half the number recorded in the previous year. Nowhere was the outbreak very severe; among districts Tanjore suffered most returning a cholera mortality rate of 2 per

mille. No district was completely free from the disease, which was most prevalent during the first two months of the year. Statistics once more show the comparative freedom from this disease that towns with a piped water supply enjoy.

Small-pox.—Small-pox caused a death rate of 0·6 per mille—a rate that was exceeded in only two provinces in India. In no district was the disease very severe but no district entirely escaped.

Plague.—To plague were attributed 3,889 deaths. Of this number the districts of Bellary and Salem were responsible for 70 per cent, recording plague death rates of 1·3 and 0·8 per mille, respectively. In only five other districts did the number of plague deaths run into three figures. Bellary is the only district in Madras in which plague has been a factor of much importance in the vital statistics. December was the month of maximum plague mortality.

Fevers.—To 'fevers' was ascribed a death rate of 7·3 per mille, a figure very closely approximating the rate for the previous year and the mean of the previous quinquennium. Fever deaths were more numerous in December than in any other month but the figures indicate no very marked seasonal prevalence. Anti-malaria measures in Madras City are making progress.

City of Madras.

70. The number of births registered was 18,331, or 90 more than in the previous year. The ratio was 35·3 against 35·2 in 1914 and 37·4 the mean of the past five years. The highest number was recorded in September and the lowest in February.

The death rate which was the lowest since 1897, was 36·00 as compared with 46·6 in the year preceding and 41·3 the quinquennial mean. The low mortality during 1915 was due chiefly to the absence of any epidemic disease and may be attributed to the improved water supply, the inauguration of anti-malaria operations and general improvement in conservancy arrangements. Small-pox, measles, cholera, enteric and malaria were more or less present throughout the year, but none assumed an epidemic form. No case of plague occurred. The two heads "dysentery and diarrhœa," and "respiratory diseases" were responsible for 4,208 and 2,303 deaths, respectively, equivalent to 8·1 and 4·4 per mille of the population. Infantile mortality was 286·1 per 1,000 births against 308·9 in 1914. The high death rate among infants is ascribed to (1) early marriage, (2) necessity for mothers to work and earn a livelihood before and soon after labour, (3) the general neglect, under feeding, bad feeding and under clothing of infants, (4) insanitary surroundings, (5) poverty and (6) want of proper medical aid.

Port of Madras.

71. During the year, 239 incoming vessels were inspected against 304 in 1914. The number of outgoing vessels granted bills of health was 170 as compared with 188 in the previous year. The decrease in the number of vessels inspected was partly due to the withdrawal of plague restrictions against the port of Calcutta during the last quarter of the year. A total number of 49,387 passengers landed at the port against 43,056 in 1914. As usual the saloon passengers were given notification papers and the deck passengers had their clothing disinfected before they were allowed ashore. Five cases of small-pox and two of chicken-pox were detected among the passengers landed and were sent to the Isolation Hospital at Kistnampet. Three cases of chicken-pox

and two contacts from among returned emigrants were sent to the Fiji Emigration Depôt.

COORG.

72. Coorg returned a birth rate of 25·3 per mille nearly one per mille less than the rate for 1914 which closely approximated the quinquennial mean. The death rate as usual exceeded the birth rate, by 5·7 in the year under report. This is explicable in part by the fact that immigrant coolies form an appreciable proportion of the population. Five per cent of the total deaths occurred among persons not permanently resident in the province. The middle four months of the year were the most unhealthy. Of the total 5,438 deaths, 4,549 were ascribed to 'fever'. There was no case of cholera and only 23 deaths were caused by small-pox. There were two deaths from plague. On the whole 1915 was a comparatively healthy year, fewer deaths having been recorded than in any one of the past five years.

BOMBAY.

73. Vital statistics indicate that 1915 was a comparatively healthy year in the Bombay Presidency. The birth rate was 37·1 per mille which is 0·3 lower than the previous year's rate but one per mille higher than the quinquennial mean. The district birth rate was highest in West Khandesh, 50·78, and lowest in Hyderabad, 17·54. The rural rate, 42·67, was nearly 11 per mille higher than the urban rate. For every hundred female births 107·7 male births were recorded. Only four of the major provinces reported a higher birth rate than did Bombay in the year under report.

The death rate fell from 29·49 in 1914 to 26·12 which is 3·8 below the mean of the previous five years. District rates varied considerably being as low as 13.7 in Upper Sind Frontier and as high as 39·2 in Sholapur. The urban death rate, 30·28, was five per mille in excess of the rural rate. More deaths occurred in December than in any other month; December deaths were 79 per cent more numerous than in June the healthiest month. Madras and the North-West Frontier Province alone among the major administrations reported a lower death rate than did Bombay. The infant mortality rate was 172 per thousand births against 193·8 in the previous year, a very satisfactory decrease.

Cholera.—The most noteworthy feature of the vital statistics for the year is the fact that cholera was responsible for but 377 deaths, as compared with 17,779 in 1914. Only once in the last fifty years has cholera been so little prevalent in this Presidency. No such immunity was observed in any other of the major administrations in 1915. Eight districts of the 27 were completely free from the disease.

Dysentery and diarrhœa.—Dysentery and diarrhœa were less prevalent than in the three previous years causing a death rate of 1·6 per mille. These diseases were most rife in the monsoon months and as pointed out by the provincial Sanitary Commissioner, can with justice be attributed to the washing of surface impurities into the water supplies.

Fevers.—A death rate of 11·48 is ascribed to 'fevers', that is to say 44 per cent of the mortality from all causes. As everywhere else in India it is not possible to define accurately the proportion of such deaths that can be ascribed directly or indirectly to malaria. The provincial Sanitary Commissioner, however, makes some very suggestive remarks about this matter. He has submitted the figures of the

southern and central registration districts to careful analysis in both of which the high incidence of fatal fevers during the first five years of life is the most significant fact that emerges. From this and certain observed facts the deduction is drawn that intestinal disorders are responsible for a very appreciable proportion of these 'fever' deaths. A careful analysis of fever deaths according to age periods and seasons might well be undertaken in other provinces; such an investigation is an essential preliminary to a fuller understanding of this most important subject.

Plague.—Plague was responsible for a more severe epidemic than any that has been experienced since 1911; to it were attributed 43,824 deaths, 2·24 per mille. Though this was in no way comparable in severity to the Punjab outbreak that has been referred to above, no other administration in India suffered as much from plague in the year under report as did Bombay. No district was completely free from the disease. Sholapur, Belgaum, Nasik and Dharwar suffered the most; in these districts the plague mortality amounted to 10·12, 10·11, 7·9 and 5·8 per mille, respectively. Six other districts reported rates above one per mille. No month was plague-free but the disease was much more prevalent during the last four months of the year than at any other time. A study of the epidemic emphasizes the danger of villages infected late in the preceding epidemic as foci for the spread of infection and the rapid dissemination of infection that takes place from large towns that are labour or trade centres. Experience in Satara town indicates that continuous rat-trapping carried out intelligently and with enthusiasm is sufficient to keep a town free from plague. The method is not a cheap one; the cost in Satara amounted to one rupee per house per annum, but after all this is not a big price to pay for freedom from plague, and the experience of Satara is well worth the consideration of plague stricken municipalities.

Small-pox.—Small-pox was the cause of 1,425 deaths—a smaller number than in any year during the last decade; the history of the few outbreaks that did occur offer striking proof of the immunity afforded by vaccination.

City of Bombay.

74. Climatic conditions were favourable in the City of Bombay which enjoyed exceptional health in 1915. The birth rate recorded was 20·47 per mille which closely approximates the previous uinquennial mean. The death rate fell from 32·5 in 1914 to 24·2 per mille the lowest rate ever recorded. When this rate is compared with the mean rate of the decade 1905—1914, 40·2, an idea is obtained of the marked improvement in health condition that was evidenced in the year under report.

Plague was responsible for but 598 deaths; in no year during the present century has so mild an outbreak been experienced. The 1912 epidemic which hitherto held the record caused a mortality of 1,717. Only sixteen deaths from cholera were reported; the mean annual mortality from this disease during the last decade is 489. Malaria caused 208 deaths which is a lower number than in any year since 1907. The steady decline in the mortality attributed to tuberculosis continues; in 1915 the tuberculosis death rate was only 1·7 per mille compared with a decennial mean of 3. Very satisfactory too is the marked decline in the infant mortality rate. It fell to 235·4 per thousand births from 268·7 in 1913 and 277 in 1914 (corrected figures.

PORT OF BOMBAY.

75. During the year 950 vessels with 203,880 crew and passengers were examined. The personal effects of 61,420 persons were disinfected. There were 36 vessels on which cases of infectious disease had occurred; these were all disinfected as well as four vessels that carried pilgrims to Jeddah. Nine other incoming vessels were fumigated. One thousand six hundred and twenty-one persons were vaccinated in addition to 2,308 outgoing pilgrims. Of the 83 cases of infectious disease that occurred on incoming vessels, 3 were of small-pox, 52 of measles, 7 of chicken-pox and 21 were cases of jigger. One case of plague, 12 of cholera, 13 of small-pox and 8 cases of chicken-pox occurred on vessels lying in the harbour and docks.

BURMA.

76. The year 1915 was not a healthy one in Burma; a serious outbreak of cholera was chiefly responsible for this, but to most causes of death was attributed a higher mortality than was evidenced in the previous year.

The birth rate in Lower Burma fell from 34·7 to 33·4 per mille which is still higher, by 0·7, than the mean of the previous five years. In Upper Burma the rate was 38 per mille which is 1·3 in excess of the 1914 figure and 2·7 above the quinquennial mean. The urban birth rate was in Lower Burma 23·3 and in Upper Burma 33·5; the corresponding rural rates were 34·8 and 38·4, respectively. The district rates were lowest in Rangoon, 19·7, Bassein, 23, and Pyapon 28·3. The highest rates were recorded in Tavoy 44·7, and Pakoku 43·9. There were 107 male births recorded for every hundred female in Lower Burma; in Upper Burma the sexes were equally balanced.

In Lower Burma the death rate advanced from 23 to 25·1 per mille (quinquennial average 24·4). In Upper Burma the rate was 32·7 to which it rose from 26·2 in 1914, the mean of the previous five years being 28·1. District rates were highest in Mandalay, 51·4, Kyaukse 49·3 and Shwebo 34·3. Amherst and Pyapon recorded the lowest rates, 18·3 and 18·9, respectively. The urban rates were 32·6 and 50·2 as opposed to rural rates of 24 and 31 in Lower and Upper Burma, respectively. The infantile mortality rate was 219·3 per thousand births, a slightly higher figure than that of the previous year.

Cholera.—Cholera was responsible for 17,597 deaths, of which 9,388 were reported from Upper Burma. The disease prevailed throughout the year but was not severe except in the months August to December which witnessed 82 per cent of the total mortality. No district was free from cholera though eleven districts of the 31 had mortality rates of less than unity. Mergui and Mandalay suffered most; they returned cholera death rates of 4·9 and 4·7 per mille, respectively. Five other districts had a mortality rate exceeding three, and five between two and three per mille.

Small-pox.—Only 217 deaths were ascribed to small-pox.

Plague.—There were 4,640 plague deaths reported in the year under review, of which 2,891 occurred in Lower Burma. This amounts to a death rate of 0·47 per mille which is 0·13 lower than the quinquennial average. Mandalay with a death rate of 2 per mille suffered most followed by Rangoon with 1·9. Only three other districts, all in Lower Burma, had death rates exceeding one per mille. Anti-plague

inoculation appears to meet with less opposition in Burma than in most parts of India.

Fevers.—To "fevers" was attributed a death rate of 8·5 per mille, a lower rate than that recorded by any other administration, Madras alone excepted. The district rates varied between 1·8 in Rangoon and 14·3 in Tavoy.

Beri-beri.—Beri-beri caused 90 deaths in Rangoon; this disease seems to have been more than usually prevalent. No other disease calls for special comment.

City of Rangoon.

77. The birth rate was 19·74 against 19·41 in 1914. The death rate fell from 33·31 in 1914 to 29·03 in the year under review: the quinquennial mean was 34·81. The reduced rate of mortality is accounted for by the lower prevalence of infectious diseases. Of the total number of 8,515 deaths, 897 were ascribed to dysentry and diarrhœa, 1,759 to respiratory diseases and 571 to plague, equivalent to 3·06, 4·52 and 1·95, respectively, per mille of population. Infantile mortality dropped from 294·22 in 1914 to 275·77 in 1915. The Society for the Prevention of Infantile Mortality continued to do good work. Four nurse midwives were engaged.

Port of Rangoon.

78. The number of incoming vessels (1,013) was less than that of the previous year by 55, but the number of passengers increased by 75,127. The Port Health Staff inspected 59 vessels as compared with 42 during 1914, and detected 49 cases of infectious diseases other than plague. Thirty-seven deaths including 16 from cholera occurred at sea. The number of outgoing vessels inspected was 285 against 350 in 1914: 112 persons were detained. Ten river steamers, three of which had plague, five cholera and one typhoid fever cases, were disinfected at Rangoon. One had a death from a non-contagious disease.

Ajmer-Merwara.

79. The number of births registered during the year was 21,953 as compared with 23,515 in 1914. The decrease was reported to be due to the emigration of a large proportion of the inhabitants with their flocks and herds on account of the scarcity of fodder.

The deaths numbered 13,052 equivalent to a ratio of 26·03 per mille of population against 30·33 in the preceding year. The decrease is attributable to the absence of plague and malaria. Only three deaths each were recorded under cholera and small-pox. The deaths from fevers numbered 2,141 less than in 1914. Dysentery and diarrhœa and respiratory diseases were responsible for 459 and 402 deaths, respectively.

Deaths of European Civil Officers and Pensioners.

80. During 1915 reports of the deaths of 96 European officers in Civil employ and pensioners were reported. The statement below gives the cause of death, and

ages at death, arranged according to six age groups :—

Deaths from	Number of deaths.	Age at death.				
		20-30 years.	30-40 years.	40-50 years.	50-60 years.	60 years and over.
Malaria	6	2	1	3	...	...
Cholera	2	...	1	1	...	...
Enteric fever	3	1	1	...	1	...
Dysentery	1	...	1	...	...	...
Liver abscess	2	1	1	...	...	...
Small-pox	2	...	...	...	...	...
Pneumonia	5	1	...	3	1	...
Tuberculosis	3	...	1	1	1	...
Anæmia	1	...	...	1	...	...
Appendicitis	1	1	...	...	...	...
Gastro-intestinal affections	4	...	2	...	...	2
Other respiratory diseases	5	...	1	2	2	...
Diarrhœa	1	...	1	...	...	...
Other digestive diseases	4	...	1	1	...	2
Heart disease or heart failure ...	19	...	1	6	4	8
Other circulatory diseases	8	...	1	3	2	2
Carcinoma	3	...	...	1	1	1
Suicide	1	1	...	...	...	...
Death by misadventure	2	1	...	1	...	...
All other causes	23	...	6	7	5	4
Total ...	96*	8	19	30	17	19

* Including 3 deaths for which age period not known.

SECTION IV.

JAILS OF INDIA.

PRISON POPULATION IN 1915 (EXCLUDING ANDAMANS).

81. The prison population of the Indian jails averaged 110,930 in 1915. This is a higher figure than any previously recorded being 8·6 per cent. higher than the corresponding figure for 1914 and 14·6 per cent. above the previous decennial average. Every administration had larger jail populations in 1915 than in the preceding year and in each case, excepting only Madras and Bihar and Orissa, was that population greater than the average of the preceding decade. The increase was more marked in the North-West Frontier Province and the Punjab than elsewhere.

SICKNESS AND MORTALITY RATES (EXCLUDING ANDAMANS).

82. Coincident with the increase in population there was a slight increase in the sickness and mortality rates but not nearly to the same extent. The constantly sick rate rose from 26 to 28 per mille as compared with 27 the decennial average; the admission rate, for all diseases, was 586 per mille against 548 in 1914 and 590 the decennial average; and the death rate increased from 17·98 to 18·74 per mille (decennial average 19·16).

Assam, Bengal, Punjab, Bombay and Madras returned lower jail death rates than in 1914; there was an increased mortality rate in each of the other administrations.

Madras returned the lowest death rate, 11·82 per mille, followed by Bombay 13·80, the United Provinces 14·58, the Central Provinces 18·98, and the North-West Frontier Province 19·09. The other five administrations returned death rates of over 20 per mille. The Punjab jails had the highest mortality rate, 25·79 per mille, closely followed by Bihar and Orissa, 25·75.

It is pleasing to note that Assam, whose jails have for years past had higher death rates than those of any other province, no longer holds that unenviable position. The fall in the Assam jail death rate from 43·45 to 21·57 per mille (decennial average 39·84) is most noteworthy. The Bombay jail death rate 13·80, as compared with 17·02 in 1914 and a decennial average 17·73, also calls for comment. These figures will be considered in greater detail later.

The chief causes of sickness were :—

	Admission rates per mille.	
	1915.	1914.
Malaria	132·1	117·3
Dysentery	61·3	60·1
Abscess, ulcer and boil ...	58·2	61·7
Diarrhœa	40·7	37·5
Respiratory diseases ...	30·2	25·7
Pyrexia of uncertain origin ...	16·2	18·6
Anæmia and debility ...	14·0	11·8
Pneumonia	12·9	10·8
Tubercle of the lungs ...	8·5	9·8

Tubercle of the lungs, pyrexia of uncertain origin, and local inflammatory conditions alone amongst these chief causes of sickness had a diminished prevalence as compared with the previous year.

The most important causes of mortality were as usual :—

Mortality rate per mille.

	1915.	1914.
Pneumonia	3·98	2·45
Tubercle of the lungs ...	3·02	3·50
Dysentery	2·72	2·62

No other disease was responsible for a death rate higher than 0·8 per mille. The decrease in the pthisis death rate is satisfactory.

MALARIA.

83. Malaria was more prevalent than in 1914 being responsible for an admission rate of 132·1 and a death rate of 0·80 per mille, compared with 117·3 and ·73. Both figures were, however, lower than the decennial average, though higher than in any of the preceding four years. Judging from the hospital admission rates the jails of the North-West Frontier Province (340·7) suffered more severely from malaria than any other province ; Bengal comes second with 332. Four administrations report a decreased malaria incidence, and six report an increased prevalence. Madras again has the lowest malaria admission rate, 17·9 per mille to which it dropped from 28·6 in 1914 and 64·1 the average for the decade. Never before has so low a figure been reported for the jails of any Indian province. Burma comes next with 30·7 and the Central Provinces third with 47·5. Most noteworthy too has been the decreased incidence of malaria in Assam. Here the admission rate in 1915 was only 69·4 per mille. In no previous year has a lower rate than 150 been reported in Assam ; in 1914 the rate was 200·9, while as recently as 1909 a rate of 573·9 was returned.

DYSENTERY.

84. Dysentery was also slightly more prevalent and caused a slightly higher mortality than in 1914; the rates per mille were :—

	1915.	1914.	1905-1914.
Death rate	2·72	2·62	3·16
Admission rate	61·3	66·1	66·0

Bengal with an admission rate of 215·5 per mille heads the list as regards prevalence of this complaint. Assam 137·8 and Bihar and Orissa 123·8, come next. The admission rates for dysentery in all other administrations were below 50. The fall in the Assam rate from 333 to 137·8 is remarkable.

The dysentery death rate was highest in Bihar and Orissa, 7 per mille, more than double the rate for 1914, and lowest in Madras, ·51, to which it fell from ·99. The decline in the Assam death rate from 16·93 in 1914 to 4·73 is most satisfactory.

TUBERCLE OF THE LUNGS.

85. Pthisis was responsible for a somewhat lower admission rate, 8·5, and a lower death rate, 3·02, than in 1914, when the figures were 9·8 and 3·50, respectively (decennial average 9·2 and 3·34 per mille). In the year under report it was second only to pneumonia as a cause of mortality. The disease appears to have been most prevalent in the Punjab, where the admission rate was 17·8 per mille, but the incidence there was appreciatively less than in 1914 when the rate was 23·9. The Punjab pthisis death rate also fell from 7·30 to 4·28 per mille, a figure below the average for the decade, (5·77). Burma returned the highest death rate from this disease 4·86. The lowest rates were reported from Bombay where pulmonary tuberculosis was responsible for admission and death rates of 3·3 and 0·78, respectively. Burma, Bihar and Orissa, the United Provinces and the Central Provinces had higher tubercle death rates than in 1914.

PNEUMONIA.

86. Pneumonia was more prevalent and caused more deaths than in 1914. It was the chief cause of mortality in the year under report having exacted a toll of 3·08 per mille. The jails of the Punjab, the North-West Frontier Province and Bombay suffered most, recording pneumonia death rates of 7·55, 6·24 and 4·90 per mille, respectively. In the two former administrations the disease had approximately doubled the normal prevalence. Pneumonia caused fewest deaths in Madras. The case mortality rate was 24 per cent.

CHOLERA.

87. Cholera was little prevalent and had an admission rate of but ·4 per mille as compared with ·7 in 1914 and 1·3 the average for the previous decade. Approximately half the attacks proved fatal. Bihar and Orissa jails were the worst affected; even here, however, the cholera death rate was only ·84 per mille. The Punjab and the North-West Frontier Province were free from the disease and no death was reported from Assam.

TYPHOID FEVER.

88. Enteric fever was little in evidence; the admission rate was 1·1 per mille and the death rate ·17 to which it fell from ·29 in 1914.

BENGAL.

89. There was serious overcrowding in nearly all the Bengal jails in 1914. The average prison population was 13,435 as compared with 11,705 in 1914 and a decennial average of 11,600. There was a constantly sick rate of 56 per mille and the very high admission rate of 1,249, against 49 and 1,061, respectively, in the previous year. In spite of these facts the death rate per mille fell from 22·55 to 21·21, decennial average 23·90.

There were but four cases of cholera, one in each of four jails; one proved fatal.

Dysentery was more prevalent than in the previous year and more fatal. The increased prevalence was common to most jails and is ascribed to overcrowding. The dysentery death rate was 6·10 per mille against 4·53 in 1914

and 5·36, the average for the previous decade. It was far and away the most important cause of mortality and next to malaria the chief cause of sickness.

Malaria was more prevalent than in 1914; it was responsible for an admission rate of 332·0 per mille and a death rate of 1·71. This latter figure approximates the average malaria mortality of the previous ten years.

Pulmonary tuberculosis was less prevalent and caused fewer deaths than in 1914; it was responsible for a mortality rate of 2·83 per mille against 4·36 in 1914 and 4·22 the average of the previous decade. The Inspector-General once more calls attention to the need of a separate tuberculosis jail for the Presidency.

In spite of overcrowding it is satisfactory to note that pneumonia was somewhat less in evidence than in the previous year.

The only really unhealthy jail in the Presidency was Dinajpur. The average population of this jail was 315; the deaths numbered 34, *i.e.*, 107·94 per mille. The jail draws its population from very unhealthy tracts; eleven of the 34 prisoners who died were admitted direct to hospital on conviction. A new hospital is urgently needed in this jail.

Of the convicts discharged during the year under report 55·92 per cent. gained weight while 22·40 per cent. lost weight.

The mortality rate was greater amongst prisoners who had spent six months or less in jail than amongst those who had been confined for longer periods.

Taking all the circumstances into consideration the health conditions of the Bengal jails were satisfactory.

ASSAM.

90. The marked improvement in the health conditions of the jails in Assam that was evidenced in 1915 is perhaps the most noteworthy and satisfactory feature in the vital statistics of Indian jails for that year. In spite of an average population (1,901) in excess of that of 1914 (1,772) the admission rate fell from 1,183 per mille to 965. Still more remarkable is the fall in the death rate from 43·45 to 21·57 per mille, the lowest death rate ever recorded in the jails of this province. No longer do the Assam jails enjoy the unenviable notoriety of being far and away the most unhealthy in India. This improvement in the health conditions in a year in which the death rate amongst the free civil population was 6·20 per mille in excess of that of 1914, must be attributed to sanitary improvements and measures designed to improve the health conditions of the prisoners and reflects the greatest credit on all concerned. The difficulties to contend with have been and are considerable. Only 52 per cent. of the prisoners were admitted in good health. Ankylostome infection is widespread; 24·25 per cent. were found infected on admission. Drug habits are common; 13·3 per cent. of prisoners admitted were so addicted.

There was only one case of cholera reported, which recovered.

Dysentery was responsible for most of the sickness as usual, but the admission and death rates due to this disease 137·8 and 4·73 per mille, compare most favourably with those for 1914, when they were 333·0 and 16·93, respectively. The decreased incidence of dysentery is ascribed in large part to the systematic treatment of all prisoners found infected with hook-worm.

Malaria was not very prevalent; the admission rate 69·4 per mille is much lower than in the previous year and is less than a quarter of the average malaria admission rate. Three deaths were ascribed to malarial fevers. Quinine as a prophylactic was issued in all jails from May to October. In most jails the drug was given in fifteen grain doses on two successive days in each week. In one instance five grains were given daily, with still better results.

There were seven admissions and four deaths caused by pulmonary tuberculosis. Three of these deaths occurred in Sylhet. Only one case of enteric fever was reported. Ankylostomiasis occasioned 52 admissions and 5 deaths.

Of the prisoners discharged 61·71 per cent. gained in weight and 20·51 lost weight during their imprisonment.

Bihar and Orissa.

91. The jails of this province, as in all other administrations, had an increased population in the year under report. The average strength was 7,146 compared with 6,525 in 1914. The increase in crime chiefly concerned crimes against property and offences of bad livelihood, probably connected with scarcity in certain districts; crimes of a more serious nature were less prevalent than in 1914. Coincident with the increase in population there was an increase in the sickness and mortality rates; the admission rate rose from 734 to 742 per mille and the death rate from 17·62 to 25·75.

The death rate 25·75 per mille was the highest recorded for these jails during the last four years and was higher than that of any other administration in the year under report except the Punjab. There was an increased mortality in every jail in the province with the exception of five district jails.

Cholera caused sixteen admissions and six deaths, a higher degree of prevalence than recorded by any other administration in 1915. All the cases were sporadic.

Dysentery was responsible for more sickness and deaths than any other disease. The admission and death rates were 123·8 and 7 per mille against 81·1 and 3·07 in the previous year. More than a quarter of the total cases occurred in Bhagalpur Central Jail. Here there were 228 admissions and 11 deaths occasioned by this disease. Many prisoners were admitted to Bhagalpur in bad or indifferent health attributable to scarcity in that district; this fact may explain in part the increased dysentery prevalence.

Malaria was somewhat less prevalent but was responsible for six deaths as compared with four in 1914. Quinine was issued as a prophylactic with, it is thought, beneficent results.

The incidence of pulmonary tuberculosis decreased from 11·5 to 9·0 per mille, but the mortality rate rose from 3·68 to 3·78. Fourteen cases with eight deaths (out of the total 64 cases and 27 deaths) occurred in Balasore jail and nine cases with six deaths in Bhagalpur. Only seven jails of the twenty-two were free from the disease.

Pneumonia was responsible for 46 admissions (6·4 per mille) and 25 deaths (3·50 per mille). The case mortality was thus abnormally high. Sixteen cases and twelve deaths occurred in Bhagalpur.

Of the prisoners discharged 54 per cent. gained weight while 18 per cent. lost weight during their confinement.

United Provinces of Agra and Oudh.

92. A population larger than in any previous year, and sickness and mortality rates larger than those of the previous year but less than the average of the preceding decade, characterized the jail vital statistics of the United Provinces in 1915. The increased population is attributed in large measure to hard times and distress and not to an increase in criminal tendencies. The continuance of the high prices prevailing in 1914 also resulted in a lower standard of health among those admitted to jail. As a consequence the admission to hospital rate rose from 397 in 1914 to 433 per mille (decennial average 520) and the death rate from 11·96 to 14·58 (decennial average 16·37). The death-rate is lower than that reported by any other administration, Bombay and Madras excepted.

Only four sporadic cases of cholera with two deaths were reported.

Dysentery which for some years past has played a smaller and smaller part in the sickness and death returns of the jails in these provinces, was more prevalent than in 1914. The admission and death rates 28·0 and 2·15 per mille were both higher than in the previous year, 26·7 and 1·24. The figures are still, however, below the decennial averages. The case mortality-rate 7·7 per cent. was high, indicating a severe type of the disease or lower powers of resistance than usual. Next to pulmonary tuberculosis dysentery was the chief cause of mortality.

Malaria was more prevalent than in any year since 1910 and caused a mortality greater than that of the preceding year or the decennial average. Deaths ascribed to malaria were twenty-eight in number; the Inspector-General considers it likely that some of these deaths were in reality due to relapsing fever but does not state the grounds for this opinion. Seven of the twenty-eight deaths occurred in Gorakhpur; these seven prisoners were admitted into jail in bad or indifferent health. Quinine was issued as a prophylactic from August to November.

Pulmonary tuberculosis was rather less prevalent but more fatal than in the previous year; the admission and death rates were 6·8 and 2·44 per mille against 7·1 and 1·93 in 1914. It was the chief cause of mortality in the jails of this province. The Inspector-General is of opinion that the prevalence of the disease is not increasing in his jails.

Pneumonia was more prevalent than in 1914 and with a mortality rate of 2·07 per mille comes third on the list of the chief causes of death.

Punjab.

93. The Punjab participated in the increase of the jail population that was evidenced in every administration of India in 1915. The average strength 15,899 was 10 per cent. in excess of that of 1914 and 42 per cent. in excess of the average of the preceding decade. This increase in population of jails in which the accommodation was insufficient in 1914 has added greatly to the difficulties of efficient administration. In these circumstances it is satisfactory to note that though the amount of sickness as exemplified by the admission rate rose from 618 to 756 per mille and the constantly sick rate from 34 to 41, the death rate fell

from 25·95 to 25·79. This rate is, however, higher than that returned from any other administration and more than double the Madras jail mortality rate. More jail accommodation is very urgently required in the Punjab.

Cholera was conspicuous by its absence.

Pneumonia was unduly prevalent in most jails as also, it is stated, among the civil population. It was the chief cause of mortality in the year under report being responsible for a death rate of 7·55 per mille, more than double the rate for the preceding year which closely approximated the average decennial rate. The case mortality rate was slightly higher than usual.

Pulmonary tuberculosis was the next most important cause of mortality and was responsible for admission and death rates of 17·8 and 4·28 per mille, respectively. These figures show a distinct improvement on the very high rates of 23·9 and 7·30 returned in 1914 but they are still excessive and indicate that the disease is much more prevalent in Punjab jails than in jails of any other province. The recent opening of the Shahpur jail for the segregation and special treatment of tuberculous prisoners should be productive of a still further decrease in the incidence of this disease, which still remains the most disquieting feature in the vital statistics of the jails of the province.

Malaria was more prevalent than in any year since 1908, an intensely malarious year when the admission rate was 164 per mille, an exactly similar rate to that of the year under report. This is a considerably higher malaria prevalence than in the previous year, 98·9 per mille. The reasons underlying the increased incidence of the disease are not stated. Montgomery Central Jail was responsible for 893 admissions, nearly a third of the total admissions for the province.

Dysentery did not play so large a part in the morbidity returns as in the previous year; the admission rate fell from 63·3 to 46·7 and the death rate from 4·59 to 2·52 per mille. In a year in which overcrowding was almost universal this is satisfactory. The admission and death rates are, however, still above the decennial averages.

Several cases of cerebro-spinal meningitis causing eleven deaths occurred in the Multan Central Jail and there were two fatal cases of plague in Shahpur jail.

Heat-stroke accounted for twenty deaths.

North-West Frontier Province.

94. The average prison population 2,724 was 17 per cent. in excess of that of 1914. The increase was to a certain extent compensated for by an increase in the jail accommodation of 227. Overcrowding was persistent in most jails. As the Inspector-General points out this does not mean that the barracks are overcrowded; the surplus population finds accommodation in tents or factory sheds; but it does add considerably to the difficulties of dealing with infectious disease should such occur and might render segregation difficult if not impossible. In the year under report the necessity for providing accommodation for political prisoners was the cause of the overcrowding that ensued.

Towards the close of the year under report typhus fever was introduced into the overcrowded Peshawar jail and caused serious mortality in the early months of 1916.

In spite of adverse conditions the constantly sick rate remained 23 per mille as in 1914; the admission rate fell from 756 to 675 per mille; but the death rate rose from 17·66 in 1914 to 19·09 per mille which is 1·52 in excess of the decennial average.

Malaria was the chief cause of sickness; though less prevalent than in the previous year the admission rate attributed to it, 340·7 per mille, is more than double that returned for any other province. Malaria was in fact responsible for more than half the total sickness. Taking this into consideration the death rate it caused, 1·10 per mille, must be considered low. Quinine was issued as a prophylactic in all jails from July to November.

Pneumonia was very prevalent and was far and away the most important cause of death. It was responsible for admission and death rates of 28·6 and 6·24 per mille against 13·4 and 4·74 in 1914, and 18·3 and 3·55, the decennial averages.

Next to pneumonia, dysentery (2·57), respiratory diseases (1·84), and pulmonary tuberculosis (1·10), were the chief causes of mortality. Dysentery was less prevalent than in 1914: on the other hand the admission rate for pulmonary tuberculosis rose from 3·9 to 7 per mille in the year under report.

The jails were quite free from cholera and enteric fever.

CENTRAL PROVINCES.

95. The average strength of the jails in the Central Provinces was 4,004 which is 278 in excess of the 1914 figure and 360 above the decennial average.

The constantly sick rate remained at the remarkably low figure of 11 per mille, the lowest rate in India; the admission rate rose from 277·5 in 1914 to 300·4 per mille and the death rate from 12·61 to 18·98. The latter figure is still 1·25 below the average for the previous decade.

There were four sporadic cases of cholera two of which terminated fatally.

Dysentery was the chief cause of mortality and was responsible for admission and death rates of 34·7 and 2·25 per mille. The latter figure is slightly in excess of that for 1914 but when the figures are compared with the decennial averages, 51·8 and 5·38, they must be considered as most satisfactory.

Malaria was more prevalent than in 1914, but even so the admission rate, 47·5 per mille, is extremely low, little more than one-third of the average for the decade: Madras and Burma alone record a lower degree of malaria prevalence. Once more no death was ascribed to malaria: in this respect the Central Provinces jails were unique among the Indian jails. Quinine is issued as a prophylactic.

There were six deaths occasioned by pneumonia and eight by pulmonary tuberculosis. The latter disease was less prevalent than in the preceding year.

One case of plague and two cases of enteric fever were reported. One of the latter is interesting; it was the case of a prisoner who was caught "eating flies to make himself ill."

Of the 76 prisoners who died 22 had been in prison less than six months.

Among the prisoners discharged 65 per cent. had gained and 13 per cent. had lost weight during their imprisonment.

BOMBAY.

96. In spite of an average prison population (10,214) 3·4 per cent. in excess of that of the previous year, the constantly sick rate fell from 26 to 19 per mille, the admission rate from 652 to 521 and the death rate from 17·02 to 13·80 per mille. Madras alone reported a lower death rate than this in the year under report. The mortality rate is the lowest ever recorded in the Bombay jails and is evidence of a healthy year.

Of the 141 prisoners who died 43 were admitted to prison in bad health, 30 of them suffering from the disease to which they succumbed. Only 71 of them were described on admission as being in good health.

Plague infection occurred in two jails: anti-plague inoculation was practised with most satisfactory results: no death occurred.

There was one case and one death from cholera.

Pneumonia was much the most important cause of death: it was responsible for admission and death rates of 16·2 and 4·90 against 17·3 and 5·06 per mille in 1914. No other disease occasioned a death rate of as much as one per mille.

Malaria was responsible for an admission rate of 161·8 which represents 31 per cent. of the admissions for all causes. It was the only disease that was more prevalent than in the preceding year. Quinine was issued as a prophylactic in twelve jails, with good results.

Of prisoners discharged 54 per cent. had gained weight and 23 per cent. lost weight during confinement.

The health conditions of Bombay prisoners appear to be most satisfactory.

MADRAS.

97. The average strength of the Madras jails was 9,810 against 9,081 in 1914 and 10,012 the average of the previous decennium. In spite of the increase of population, the sickness and mortality rates were all extremely low. The constantly sick rate fell from 16 to 13 per mille, a lower rate than that of any other administration, the Central Provinces alone excepted; the admission rate fell from 304 to 248 per mille, the lowest rate on record; and the death rate was 11·82 against 12·44 in 1914 and a decennial mean of 17·54. These admission and death rates are considerably lower than those of any other province.

Malaria was responsible for an admission rate of but 17·9 per mille against 28·6 in 1914 and an average rate of 64·1. This is much the lowest admission rate ever recorded in the jails of any administration. Two deaths were ascribed to malaria, both in Bellary. This is the only province in India in which malaria is not the chief factor in the sick returns.

Dysentery was responsible for more admissions to hospital than any other disease; even so the admission rate amounted to only 21 per mille and the death rate to 0·51.

Pulmonary tuberculosis was responsible for more deaths than any other single disease and caused admission and death rates of 6·5 and 2·55 per mille, respectively, against 7·3 and 2·97 in the previous year.

There was a decreased prevalence of every disease as compared with 1914 with the single exception of pneumonia and the increase under this head was insignificant.

Of the prisoners discharged 69 per cent. gained weight and 14 per cent. lost weight during their imprisonment.

BURMA.

98. With the highest average jail population on record (17,474), 5 per cent. in excess of that of 1914 and 18 per cent. in excess of the average of the previous decade, the sickness and mortality rates of the Burma jails showed a corresponding increase over those of the previous year. The constantly sick rate rose from 15 to 16 per mille, still a remarkably low figure; the admission rate was 291·3 against 269·9 in 1914; and the death rate increased from 17·66 to 20·09 per mille. The admission rate though higher than the decennial average is still much lower than that of any other administration, Madras alone excepted.

There were thirteen fatal cases of cholera reported from six different jails.

Dysentery was more prevalent than in 1914 and was responsible for admission and death rates of 24·3 and 1·66 per mille against 16·0 and 1·38. In Rangoon many of the cases were associated with the drug habit (opium and morphine).

Malaria was responsible for more admissions than any other single cause but even so the admission rate attributed to this disease was only 30·7. When it is recalled that the malaria admission rate for the jails of India amounted to 132 per mille, the relative freedom from malaria of the jails of Burma is appreciated.

Pulmonary tuberculosis was as usual the chief cause of mortality. Though its prevalence in the year under report closely approximated that of the preceding year and the decennial average, the death rate amounted to 4·86 per mille against 4·20 in 1914 and 3·80 the average for the previous decade. This jail tubercle death rate is higher than that returned by any other administration in 1915. Thirty-six of the 85 deaths occurred in Insein: this is accounted for by the transference to this jail of weakly prisoners.

Forty-seven admissions and 10 deaths were occasioned by typhoid fever. There were two fatal cases of plague. Beri-beri caused twenty-one admissions.

Morphinism was once more an important factor in the vital statistics of the Rangoon jail where it caused thirteen deaths. 41·8 per cent. of the deaths in this jail were directly or indirectly attributable to a drug habit. Of the total number of convicts admitted to the Burma jails, 11·3 per cent. admitted that they were opium consumers.

Of convicts released 55·5 per cent. had gained weight during confinement, while 19 per cent. lost weight.

The Andamans.

99. The average strength of the convict population was 12,239 to which it rose from 11,996 in 1914 : the average population for the preceding decade was 12,978.

The year was an unhealthy one. The constantly sick rate rose from 46 to 58 per mille (decennial average 72). The admission and death rates 1,876 and 45·02 per mille were considerably higher than in 1914, 1,364 and 25·18 and the averages for the preceding decade 1,652 and 30·49. The death rate is the highest recorded since 1899.

The chief factor in the production of these unhealthy conditions was the prevalence of a malignant type of malaria which was directly responsible for a death rate of 3·27 per mille and indirectly for the debility that made the sufferers vulnerable to the ravages of other more fatal diseases notably pneumonia. The malaria admission rate 1,343·1 was 60 per cent. in excess of that for the preceding year. The immediate causes underlying the increased malaria incidence are by no means clear. Anopheline mosquitos did not appear to be unduly prevalent The vital statistics for 1915 emphasize the urgent necessity of energetic action in the matter of swamp reclamation. There were four cases of blackwater fever, one of which proved fatal.

Pneumonia was by far the chief direct cause of mortality and was responsible for a death rate of 10·62 per mille, *i.e.*, nearly a quarter of the total deaths. It was of a very severe type, the case mortality being 43 per cent.—a very high figure for this disease. Malaria seems to be a most important factor in the etiology of pneumonia in the Andamans.

Pulmonary tuberculosis caused a death rate of 4·00 per mille as against 2·58 in 1914 and 5·70 the average for the decade. Dysentery was less prevalent than in 1914 but it caused a death rate of 3·84 against 3·25. Scurvy was responsible for 243 admissions and seven deaths.

SECTION V.

VACCINATION.

VACCINATION IN INDIA.

100. There were 9,572,083 vaccination operations performed in British India during 1915-16, an increase of 109,182 compared with 1914-15; primary cases numbered 8,275,693 and revaccinations 1,296,390, against 8,212,851 and 1,250,050, respectively, in the previous year. There was a decline in the work of the Vaccination Department in some of the provinces, notably the United Provinces, Bihar and Orissa and the Central Provinces and Berar. The total cost of the Department increased from Rs. 17,40,226 in 1914-15 to Rs. 17,89,621 in 1915-16.

The comparative statement below shows the total number of operations performed, the percentage of successful cases to total operations, the average cost of each successful case and the number of deaths from small-pox in the several provinces as compared with 1914-15. The statements in the Appendix to this Section give full particulars as to the vaccination operations carried out in the various provinces during the year.

Province.		Total number of vaccinations performed.		Percentage of successful cases to total vaccinations.		Average cost of each successful case.	Number of deaths from small-pox.
		Primary.	Revaccinations.	Primary.	Revaccinations.		
						Rs. A. P.	
Delhi	1914	12,220	3,359	98·91	72·13	0 4 3	43
	1915	12,968	2,776	99·11	70·61	0 3 11	14
Bengal	1914	1,137,879	460,749	97·66	64·01	0 2 3	9,935
	1915	1,261,921	369,697	98·09	67·16	0 2 1	32,785
Bihar and Orissa ...	1914	1,245,824	68,218	99·68	72·63	0 3 2	5,778
	1915	1,217,591	70,828	99·46	64·81	0 1 5	15,526
Assam	1914	280,292	39,724	96·22	68·69	0 3 7	2,575
	1915	273,573	38,825	96·63	62·29	0 3 1	4,076
United Provinces of Agra and Oudh.	1914	1,543,567	110,817	97·35	71·76	0 1 11	17,954
	1915	1,523,656	104,711	97·34	74·46	0 2 0	2,304
Punjab	1914	671,261	165,378	97·13	70·69	0 3 3	2,900
	1915	669,236	185,812	96·51	73·22	0 3 1	1,694
North-West Frontier Province.	1914	141,546	12,633	98·66	88·39	0 1 8	331
	1915	125,177	18,527	98·62	91·31	0 1 10	26
Central Provinces and Berar	1914	526,214	76,429	97·21	63·27	0 2 6	4,581
	1915	518,088	81,871	97·57	63·71	0 3 3	1,151
Madras	1914	1,512,515	176,407	90·8	79·1	0 3 10	27,889
	1915	1,532,185	268,985	87·7	75·7	0 3 9	24,038
Coorg	1914	8,825	5,796	96·71	85·33	0 3 10	114
	1915	8,348	4,669	96·54	89·20	0 4 5	23
Bombay	1914	711,179	63,596	99·10	57·03	0 8 5	4,209
	1915	719,960	70,965	98·91	55·83	0 8 8	1,425
Burma	1914	405,724	66,843	94·92	60·54	0 8 5	258
	1915	395,597	78,462	97·14	57·65	0 9 1	217
Ajmer-Merwara ...	1914	15,805	101	97·23	85·09	0 3 8	23
	1915	17,393	262	97·65	92·75	0 3 2	3
Total ...	1914	8,212,851	1,250,050	95·56	68·38	0 3 4	76,590
	1915	8,275,693	1,296,390	95·33	66·80	0 3 5	83,282

VACCINE LYMPH.

101. Glycerinated vaccine lymph was used in all provinces, supplied in most instances by their respective vaccine depôts. The North-West Frontier Province and Delhi were, as usual, supplied with lymph from the Punjab vaccine depôt. The Punjab depôt also supplied lymph to the Native States in the Punjab and the Jammu and Kashmir States: large quantities were also supplied to the military authorities for use out of India with the Indian Expeditionary Forces. In the United Provinces glycerinated paste was made use of to a small extent: the outturn of the United Provinces depôt was greatly reduced in 1915 owing to the establishment of a provincial depôt by the Bihar and Orissa Government. Lanoline paste was largely used in Madras, glycerinated vaccine lymph being supplied only to Madras City and Colombo. The success rate in the Madras Presidency for the year was the lowest recorded since 1904-05. This is attributed to the new method introduced of storing vaccine pulp in the raw condition and grinding and mixing it with lanoline as required for issue. The method has proved a failure and has been abandoned. In the Bombay Presidency glycerinated animal and human lymphs were used: the former was used throughout the districts and gave satisfactory results; human lymph was used only in some of the Native States.

GENERAL REMARKS.

102. In the Bengal Presidency free vaccination was introduced in certain districts, a measure which did something towards removing existing objections to vaccination and led to an increase in the number of operations performed. In municipalities there was a decrease in vaccination operations as compared with the previous year, due, it is reported, to the lessened prevalence of small-pox. More than twice as many vaccinations were performed in factories and on tea-gardens as in the previous year.

The decrease in vaccination work in Bihar and Orissa is attributed to a deterioration in discipline and energy of the Inspecting Staff. Necessary action in this respect is being taken.

The slight decrease in Assam is attributed to greater strictness and better supervision leading to more accurate returns being obtained from one or two large districts, in which it appears falsification of returns had in the past been considerable.

Local unrest and threatened troubles on the frontier led to a decrease in vaccination work in the North-West Frontier Province. Satisfactory progress was, however, made in the Agencies of Kurram and Tochi, the Chitral Sub-Agency and in the Swat Valley and Shirani country. The attitude of the people on the whole to vaccination has been more favourable, but, as elsewhere in India, the inhabitants cannot be brought to understand the need for revaccination.

In the Madras Presidency the number of vaccination operations performed exceeded that for the previous year though, as already stated, the success rate was the lowest recorded since 1904-05. In municipalities vaccination work was on the whole successful.

Though the total number of operations performed in the Bombay Presidency exceeded that in 1914-15, there was a decrease in the number of primary operations: this is attributed to the increased incidence of plague in certain districts leading to the evacuation of villages. A special vaccination campaign among school children was conducted in certain districts with great success.

In Burma there was a decrease in the number of primary operations performed as compared with the previous year. The decrease is attributed to the large deficit in the number reported from the Southern Shan States due to the cessation of the vaccination campaign that was carried out in 1914-15.

VACCINATION AMONGST TROOPS.

103. Particulars of vaccination in the Army will be found in Statement III of the Appendix to Section V of the Annual Report of the Sanitary Commissioner with the Government of India.

SECTION VI.

MEDICAL INSTITUTIONS.

(*Contributed by the Director-General, Indian Medical Service.*)

1.—State-Public, Local Fund and Private-aided Civil Hospitals and Dispensaries.

104. These institutions, at the end of 1915 numbered 2,980 an increase of 139 on the totals for 1914, and the demand for the opening of more is felt in nearly every part of India.

The number of in-patients and out-patients has greatly increased and the total increase of both classes is 1,647,409.

The number of operations has increased by 64,261 over the total for 1914.

The following tabular statement compares the figures of 1914 with 1915 :—

Province.		Number of Institutions.	Number of In-patients.	Number of Out-patients.	Total number of Patients.	Number of Operations.
Delhi	1914	14	4,964	287,074	292,038	11,118
	1915	14	5,765	279,847	285,612	14,391
Bengal (excluding Calcutta) ...	1914	414	38,056	4,020,643	4,058,699	116,304
	1915	439	40,343	4,481,606	4,521,949	120,013
Calcutta	1914	15	29,083	319,062	348,145	36,449
	1915	15	27,696	327,978	355,674	35,725
Assam	1914	155	11,457	1,606,259	1,617,716	26,516
	1915	151	9,621	1,510,363	1,519,984	22,747
Bihar and Orissa	1914	209	31,593	2,230,361	2,261,954	110,562
	1915	226	34,912	2,438,768	2,473,680	115,629
Central Provinces	1914	179	15,418	1,731,006	1,746,424	49,029
	1915	185	15,282	1,787,496	1,802,778	49,978
United Provinces	1914	398	75,426	4,432,919	4,508,345	217,014
	1915	461	77,277	4,979,254	5,056,531	235,822
Punjab	1914	297	88,774	4,778,611	4,867,385	260,775
	1915	304	89,910	4,685,910	4,775,820	275,506
Burma	1914	200	63,920	1,602,282	1,666,202	51,491
	1915	206	66,057	1,725,733	1,791,790	50,114
Bombay	1914	353	61,786	2,423,987	2,485,773	101,467
	1915	359	61,390	2,491,077	2,552,467	101,822
Madras	1914	530	91,565	6,652,153	6,743,718	259,566
	1915	541	90,867	7,039,435	7,130,302	282,167
North-West Frontier Province ...	1914	53	14,084	879,421	893,505	39,053
	1915	53	13,211	880,043	893,254	39,267
Baluchistan	1914	24	5,597	249,711	255,308	5,411
	1915	26	5,043	227,737	232,780	5,905
Total ...	1914	2,841	531,723	31,213,489	31,745,212	1,284,825
	1915	2,980	537,374	32,855,247	33,392,621	1,349,086

DELHI.

105. There were 21 hospitals and dispensaries open at the end of 1915 as compared with 22 in 1914. The number is made up of 7 State-special dispensaries, 12 Local Fund dispensaries and 2 private-aided dispensaries.

There has been a large increase in the surgical work of the Dufferin Hospital and a separate eye department has been established. A total of 2,106 selected eye operations were performed as compared with 153 in the previous year.

The total expenditure was £8,281 of which Indians contributed £173.

BENGAL (EXCLUDING CALCUTTA).

106. There was an increase of 25 institutions during the year, and the totals of treated patients increased by 463,250.

A floating dispensary was opened for 3 months in the Khari river, and a travelling dispensary in the district of Murshidabad. These dispensaries are not successful owing to the difficulty in providing satisfactory Sub-Assistant Surgeons for medical charge.

In common with all other provinces Bengal has had to work very short-handed owing to the depletion of the medical cadre to meet the requirements of the military situation.

Total expenditure was £86,214 of which £18,254 was subscribed by Indians.

CALCUTTA.

107. The Carmichael Nurses Home was opened in connection with the Howrah General Hospital.

Land has been acquired for the urgently required new eye hospital and the building project sanctioned. Work has not yet been begun owing to the impossibility to spare the money.

The buildings of the new School of Tropical Medicine have been completed. It has not however been found possible to open the school owing to the shortage of officers on account of the war.

The maintenance charges were £10,821 of which Indian contributions covered £2,662.

ASSAM.

108. Four travelling dispensaries that were opened in 1914 had to be closed owing to want of facilities of communication in low-lying localities on account of floods.

There is still a difficulty in supplying Sub-Assistant Surgeons and the scarcity of this class has been much exaggerated owing to the withdrawal of men for military duty.

The total expenditure was £27,588 of which £466 was contributed by Europeans and £1,690 by Indians.

BIHAR AND ORISSA.

109. The year began with 209 institutions and ended with 226, a net increase of 17. The King Edward VII Memorial Hospital at Bettiah, and a small hospital

for Europeans (4 beds) at Ranchi, were opened during the year. Electric lights and fans were installed in the Cuttack General Hospital, and an X-ray apparatus in the Ranchi Sadar Hospital. Seven travelling dispensaries worked under the Sanitary Commissioner during the year and treated 36,016 patients.

The demand for more dispensaries is felt, and schemes for a considerable addition to the total number have matured, and in several places work on the necessary buildings has already commenced.

Medical officers specially deputed to visit fairs and markets treated 80,088 patients.

The total expenditure incurred for the upkeep of the hospitals and dispensaries amounted to £69,176 of which £7,996 was contributed by Indians.

Owing to the war there was a further depletion in the cadre of Indian Medical Service officers, their places being generally filled by the more Senior Civil Assistant Surgeons who have carried on the work satisfactorily.

CENTRAL PROVINCES.

110. The number of institutions on the list increased by six; and there was an increase of over 56,000 in the total number of patients treated. The three peripatetic dispensaries maintained as an experimental measure during 1915 are reported on as doing most useful work and they are now being taken on the strength of the permanent establishment as from January 1st, 1916.

The total expenditure amounted to £60,962 against £60,679 in 1914.

The pay of Sub-Assistant Surgeons was raised substantially from August 1st, 1915, with the result that all vacancies have now been filled.

UNITED PROVINCES.

111. The large increase in the number of institutions is due to the inclusion of the 47 travelling dispensaries for the first time in the list. These dispensaries are Government institutions towards the maintenance of which District Boards contribute a fixed yearly amount. Their up-keep is permanent and each dispensary is practically permanently attached to the district which contributes to its support.

The number of patients attending has increased to a remarkable extent—though the figures are swelled by the inclusion of the 340,093 patients treated in the 47 travelling dispensaries.

The system of charging fees from well-to-do patients has continued and has generally worked satisfactorily.

The total expenditure was £109,892 as against £101,645 in 1914. Europeans subscribed £1,403 and Indians £8,938.

PUNJAB.

112. The number of institutions was 304 as compared with 297 in 1914. There was a small increase in the number of in-patients, but the number of out-patients fell by 92,701. The decrease was shared by every district. In some of the districts the growing demands for organised medical relief cannot be met by the number of dispensaries, and proposals are to be put forward to secure adequate relief.

The new buildings for the Mayo Hospital and Medical College were declared open in December 1915.

The dearth of workers is still a serious obstacle to the spread of female medical aid. Facilities for education is now provided by the Punjab Medical School for women at Ludhiana.

The medical cadre has been depleted by the reversion of Medical Officers and Assistant and Sub-Assistant Surgeons to military duty.

The total expenditure was £93,343 out of which Europeans contributed £3,156 and Indians £2,367.

North-West Frontier Province.

113. There has been no change in the number of institutions and the figures for patients treated show little variation.

The Municipal Hospital, Abbottabad, was completed during 1915 and one additional travelling dispensary has been sanctioned.

The total expenditure was £14,196 for the year.

Baluchistan.

114. There were 26 institutions open during the year against 24 the year before, which treated 232,780 patients: of these 5,043 were in-patients and 227,737 out-patients. A total of 5,905 operations were performed. Despite difficulties connected with Medical personnel, there was a decrease of only 7·14 per cent in the total number treated.

The expenditure amounted to £6,060 compared with £6,006 in 1914.

Burma.

115. The number of institutions increased by 54, and there was a marked increase in the number of patients treated—the most numerous being among the Burmese themselves.

The three years' course in training nurses at the General Hospital, Rangoon, has worked satisfactorily. There are numerous applications for admissions from all parts of India and Burma. A scheme has been put into operation as from July 1st, 1915, for training for a period of 2 years of 5 Burmese and Karen women annually.

The outlay on Hospitals and Dispensaries was £138,257. At Sagu, Minbu district, a dispensary was constructed at a cost of Rs. 37,774 raised by private subscriptions.

Bombay.

116. There was an addition of six institutions during the year. As compared with 1914 the total number of patients treated showed an increase of 2·7 per cent, the increase being entirely due to the larger number of out-patients. Notwithstanding the changes in personnel caused by the reversion of Medical Officers to the military department on account of the war a high standard of surgical work was maintained throughout. The total expenditure amounted to £170,369.

MADRAS.

117. The number of institutions rose from 530 to 541 including the itinerating dispensaries, and total number of patients treated increased from 6,743,718 to 7,130,302. The increase in the number of operations is marked in the less serious daily occurring operations.

Large number of patients come to the Madras hospitals from *mufassal* districts, and there was a heavy strain on the nursing staff which sooner or later must be strengthened. The institution of an efficient nursing service in the *mufassal* is receiving attention.

The system of appointing young medical graduates as house surgeons and physicians to the principal hospitals in Madras was continued in 1915, and the reports on those employed, have been satisfactory.

The total expenditure was £63,443 in the City of Madras and £148,573 in the *mufassal.*

II.—State-Special, Railway and Private non-aided Civil Hospitals and Dispensaries.

118. The two following tables show the number of institutions open and give details of the work done by them in each province :—

State-Special and Railway Hospitals.

Province.		Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Delhi	1914	8	1,497	26,926	28,423	754
	1915	7	1,253	32,820	34,078	924
Bengal (excluding Calcutta) ...	1914	96	16,516	334,271	350,787	7,681
	1915	93	16,203	330,212	346,415	7,099
Calcutta	1914	2	3,334	6,191	9,525	238
	1915	2	2,897	5,998	8,895	351
Assam	1914	43	3,277	64,744	68,021	921
	1915	49	3,695	70,832	74,527	766
Bihar and Orissa	1914	75	6,402	194,909	201,311	5,804
	1915	76	6,950	209,829	216,779	6,563
Central Provinces	1914	56	3,896	161,234	165,130	2,652
	1915	57	5,734	169,511	175,245	2,617
United Provinces	1914	129	18,848	310,903	329,751	76,476
	1915	121	17,207	321,869	339,076	7,183
Punjab	1914	157	7,988	553,399	561,387	18,820
	1915	157	6,626	580,624	587,250	17,115
North-West Frontier Province ...	1914	27	9,649	120,005	129,654	3,315
	1915	27	8,916	113,457	122,373	3,191
Baluchistan	1914	5	1,984	44,852	46,836	953
	1915	8	2,250	47,986	50,236	1,140
Burma	1914	72	17,157	233,690	250,847	2,606
	1915	72	18,443	221,600	240,043	3,255
Bombay	1914	74	5,170	244,896	250,066	6,436
	1915	74	6,347	260,465	266,812	7,014
Madras	1914	103	11,552	269,143	280,695	5,970
	1915	103	11,295	259,597	270,892	7,512
Total ...	1914	847	107,270	2,565,163	2,672,433	63,626
	1915	846	107,821	2,624,800	2,732,621	64,730

Private, non-aided Institutions.

Province.		Number of Institutions.	In-patients.	Out-patients.	Total.	Operations.
Bengal (excluding Calcutta) ...	1914	139	6,033	1,155,805	1,161,838	24,973
	1915	142	6,251	1,169,023	1,175,274	24,374
Calcutta	1914	3	583	30,414	30,997	2,238
	1915	2	630	28,420	29,050	2,020
Assam	1914	6	75	24,224	24,299	381
	1915	6	73	24,710	24,783	371
Bihar and Orissa	1914	65	8,426	687,955	696,381	22,954
	1915	64	8,757	692,927	701,684	21,508
Central Provinces	1914	38	1,679	145,563	147,242	2,560
	1915	39	2,075	165,002	167,077	2,657
United Provinces	1914	49	7,386	387,435	394,821	9,937
	1915	47	6,533	398,542	405,075	10,323
Punjab	1914	13	4,781	84,577	89,358	3,550
	1915	12	4,795	73,260	78,055	3,230
North-West Frontier Province ...	1914	7	2,715	159,324	162,039	9,822
	1915	7	2,392	116,357	118,749	10,098
Baluchistan	1914	2	79	22,571	22,650	277
	1915	2	102	18,503	18,605	252
Bombay	1914	333	29,430	2,016,768	2,046,198	62,781
	1915	337	25,591	1,984,804	2,010,395	67,074
Madras	1914	55	12,272	321,179	333,451	14,261
	1915	53	11,900	335,200	347,100	16,225
Total ...	1914	710	73,459	5,035,815	5,109,274	153,734
	1915	711	69,099	5,006,748	5,075,847	158,132

III.—Lunatic Asylums.

119. The table attached gives the number of lunatic asylums in each province during 1915, the total population of such institutions in each province and the numbers discharged cured, and that died. The totals for all India are given for 1914 and 1915.

There was no change in the number of asylums during the year; the total asylum population increased from 8,452 to 8,978 and the total discharged as cured rose from 832 to 861. The increase in total number of admissions is spread over each province.

Province.	Number of Asylums.	Admitted and re-admitted during year.	Total Asylum population.			Discharged cured.	Died.	Daily average strength.	Daily average sick.	Criminal lunatics.
			Males.	Females.	Total.					
Bengal	3	214	1,072	214	1,286	79	85	1,088·11	84·38	602
Assam	1	129	340	80	420	32	29	324·94	60·46	123
Bihar and Orissa ...	1	99	351	50	401	37	41	315·18	22·61	183
United Provinces ...	3	431	1,393	364	1,757	144	140	1,369·37	199·59	351
Punjab	1	311	818	235	1,053	116	73	763·50	68·49	180
Central Provinces ...	1	137	416	95	511	56	46	373·97	15·33	107
Bombay	6	499	1,325	327	1,652	231	85	1,194·0	39·5	224
Madras	3	268	802	258	1,060	94	83	799·47	103·15	218
Burma	2	251	680	158	838	72	53	623·18	184·77	357
Total ... 1915	21	2,339	7,197	1,781	8,978	861	635	6,851·72	778·28	2,345
Total ... 1914	21	2,083	6,717	1,735	8,452	832	625	6,528·21	658·27	2,243

In Bengal the ever growing asylum population is a serious tax on the capacity of the lunatic asylums. An extension of accommodation was provided at Berhampore to tide over the interval till the new central asylum at Ranchi is opened.

The health of all the inmates was satisfactory and there were no outbreaks of epidemic disease.

The figures for Assam call for no special remarks.

In Bihar and Orissa the insufficiency of accommodation was met by the construction of new wards. Still further extensions are under consideration.

In the United Provinces the admissions rose from 396 to 431, the highest recorded for the last five years. There was no overcrowding.

The Punjab asylums showed 311 admissions, an increase of 47 on the previous year. There were no epidemics and both the death rate and daily average sick rate were

lower than in any year since 1910. During the year cubicular accommodation to the number of 90 was added by the conversion of some of the sleeping barracks. With the increasing number of inmates extra accommodation will be a matter of urgency in the near future.

The admissions in the Central Provinces were 137 against 120 in 1914, and of this number 126 were males and 11 females. There was overcrowding on the male side. Administrative sanction for new buildings in the asylum has been received.

In Bombay structural improvements at the asylums at Dharwar, Ahmedabad and Hyderabad were carried out. At the Central Asylum, Yeravada, the provision of padded rooms, central bath and improvements to the hospital are required. The necessary plans and estimates are being prepared.

No epidemics occurred in any of the asylums.

In Madras there was a slight decrease in admissions from 270 to 268. At Calicut a block of four cells for males under observation was completed. There was no epidemic and no overcrowding.

No change has been made in the total accommodation for Burma, but as the asylum population continues to show a steady increase the prospects of overcrowding have become very real, and plans for new lunatic asylum buildings have been discussed and adopted.

IV.—Medical Colleges.

BOMBAY.

120. *Grant Medical College.*—There were 631 students of which there were 41 female students. The following statement shows the number of candidates that presented themselves for the various examinations and the number who passed :—

Examination.	Number of candidates.	Passed.	
		Males.	Females.
L. M. & S.			
Part I	48	21	3
Part II	47	24	3
M. B., B. S.			
Preliminary	203	126	13
Intermediate	235	106	5
Final { Part I	77	43	1
Final { Part II	100	45	2
M. D			
Branch I, Medicine	1	...	...
Branch II, Midwifery	...	...	...
M. S.	1	1	...
BACHELOR OF HYGIENE.			
Part I	10	4	...
Part II	7	5	...
Doctor of Hygiene	1	...	...

There were 27 Military Medical pupils under training as Military Assistant Surgeons, of whom 3 were removed and 3 passed out from the College during the year.

MADRAS.

121. *Madras Medical College.*—There were four hundred and twenty-five students on the rolls of the College distributed as follows :—

Class.	Males.	Females.	Total.
M. B. & B. S.	168	14	182
L. M. & S.	100	1	101
B. Sc.	2	...	2
Apothecary	...	21	21
Military Pupils...	27	...	27
Chemists & Druggists	11	...	11
Sanitary Inspectors including 2nd Class Medical Officers of Health.	81	...	81
Total ...	389	36	425

The following table details the number of students who sat for the University examinations and the number that passed :—

Examination.	Number of candidates.	Passed.
L. M. S. (*new*)—		
1st Examination	1	...
„ Examination (*old*)	...	...
2nd Examination	20	13
„ Examination (*old*)	...	...
3rd Examination (*new*)	29	20
Final Examination (*old*)	7	5
„ Examination (*new*)	38	20
M. B. & C. M.—		
1st Examinaton (*old*)	...	...
2nd Examination (*old*)	...	...
3rd Examination (*old*)	...	...
M. B. & B. S. (*old*)		
1st Examination (*new*)	81	50
2nd Examination (*new*)	33	22
3rd Examination (*new*)	34	24
Final Examination (*new*)	31	12
Total ...	274	166

Seven female students appeared for the 1st M. B. examination of whom 4 passed and one was found qualified for the L. M. & S. One appeared for the L. M. & S. and failed. Of the two who appeared for the 2nd M. B., one passed. Two appeared for the Final M. B. & B. S. and both passed. Six students in the Final year class of the Apothecary Department passed. Of the 27 Military Pupils, 3 passed out of the College and were appointed Military Assistant Surgeons.

PUNJAB.

122. *Lahore Medical College.*—The total number of students on the rolls of the College was 176 as follows :—

Government Scholarship holders :—	
Punjab	24
North-West Frontier Province	1
Non-Government Scholarships	10
Other students	141
	176

The following statement gives the number of students that appeared for the University examinations and the number that passed :—

Examination.	Candidates.	Passed.
Final L. M. S. (*old*)	1	...
Final M.B., B.S.	47	38
2nd „ „	22	20
2nd L. M. S. (*old*)	1	1
1st M. B., B. S.	46	33
Total ...	117	92

Two female students appeared for the final examination for the College L. P. M. S. certificate and both failed. Five female students appeared for the 1st examination for the College L. P. M. S. certificate and one passed.

The extensions under the King Edward memorial scheme are now well forward. The new main College block was personally opened by His Excellency the Viceroy on the 10th November 1915 and is almost ready for occupation. Extensions to the Anatomical Department have been partially completed and the new Anatomical Theatre and Tutorial Rooms have been in use since the new year. The Research Block which is practically completed still requires much to be done in the way of fitting and the cold storage Block including the *post mortem* rooms is approaching completion.

BENGAL.

123. *The Calcutta Medical College.*—During the year there were 916 male, 21 female and 77 military students on the rolls of the College or a total of 1,014 students. Applications for admission numbered 720 against 702 in the previous years : 162 of the former were admitted.

The following statement shews the number of students who appeared for the University examination and the number that passed :—

Examination.	Number of candidates.		Passed.	
	Males.	Females.	Males.	Females.
Preliminary Scientific M. B ...	190	5	151	5
1st M. B. Examination	296	6	130	4
2nd M. B. Examination	173	3	97	2
Doctor in Medicine	2	...	2	...
Preliminary number State Medical Faculty	5	...	2	...
Intermediate	14	...	8	...
Total ...	680	14	390	11

Two students in the female certificate class passed the final Diploma examination and left the College, thus closing the female certificate class of this college for ever.

Eight Military pupils passed the final examination and left the college on being appointed as Military Assistant Surgeons.

UNITED PROVINCES.

124. *King George's Medical College, Lucknow.*—There were 136 students on the rolls of the College, 131 males and 5 females.

The following statement shows the number of students who appeared for the different examinations and the number that passed :—

Examination.	Number of candidates.		Passed.	
	Males.	Females.	Males.	Females.
1st M. B., B. S.	29	...	6	...
Final M. B., B. S., Group "A" ...	22	2	16	2
Final M. B., B. S., Group "B" ...	19	...	13	...
Female certificate class examination, 3rd final examination.	...	1	...	...
Total ...	70	3	45	2

Owing to the financial stringency caused by the war it was not practicable to carry out many of the estimates which have been administratively sanctioned for improvements and additions to the buildings of the College.

V.—Medical Schools.

There are 15 Medical Schools distributed as follows:—Bengal 2, Madras 3, Bombay 3, United Provinces 1, Punjab 2, Burma 1, Bihar and Orissa 2, and Assam 1.

BENGAL.

125. *The Campbell Medical School, Calcutta.*—During the year there was a total of 381 students on the school rolls, 360 of whom were males and 21 females.

The following table gives the number of students who appeared for examination:—

Examination.	Students.		Passed.	
	Males.	Females.	Males.	Females.
Licensed Medical Practitioners Diploma—				
Final Examination	95	6	55	1
Junior Examination	19	1	14	1
Compoundership	133	...	116	...

The establishment and equipment of a Chemical and Physics laboratory for 1st year students is considered necessary as well the appointment of whole-time Demonstrator in Physiology, as the students have to attend the Medical College, Calcutta, for a course in Chemistry and Physics and there is only one Demonstrator for practical classes in Physiology and Pathology.

The Dacca Medical School.—There were 251 male and 3 female students on the rolls of the school, making a total of 254. The following statement details the result of the school examination:—

Examination	Candidates.		Passed.	
	Males.	Females.	Males.	Females.
Licensed Medical Practitioners Diploma—				
Final Examination	49	1	37	1
Junior Examination	14	...	14	...
Compoundership	127	...	120	...

Thirteen passed students were recruited into the service of Government.

MADRAS.

126. *Medical School, Royapuram.*—At the beginning of the year there were 225 pupils (209 male and 16 female) including 41 in the Indian Military Pupil Class. 56 students appeared for the 1st year examination and 41 passed; 54 students appeared for the 2nd year examination and 52 passed. Of 47 who appeared for the 3rd year examination all passed, and out of 59 final year students 50 were successful.

Plans for the accommodation of 210 students, in addition to the 50 rooms in the old hostel, have been submitted to Government and commencement of work on them is awaited.

Prince of Wales' Medical School, Tanjore.—There were 123 pupils on the rolls. Out of 26 pupils who went up for the final examination 24 passed. 29 and 23 pupils, respectively, passed the third and second year examination and 29 out of 34 first year pupils were successful at the first year examination.

Plans and estimates were prepared for construction of a new Medical School and Hostel but they have had to lie over owing to the present financial crisis.

Medical School, Vizagapātam.—There were 96 pupils on the rolls. Of 21 final year, 18 third year, 17 second year and 27 first year pupils, 17 of each respective class passed the final examination. Owing to the rebuilding of the Civil Hospital, the Medical School was converted for use as a Hospital and alterations made to render it suitable for the purpose.

BOMBAY.

127. *Medical School, Hyderabad (Sind).*—There were 142 pupils on the school's rolls, which number was comprised of 132 Hindus and Brahmans, 8 Muhammadans, 1 Christian and 1 Parsi.

17 students appeared for the final examination of whom 14 passed. 8 of the successful students were admitted into the Department as Sub-Assistant Surgeons.

The proposal to appoint a whole-time teacher for Anatomy and Physiology, though administratively approved, were postponed on account of the present financial situation.

The Byramjee Jeejeebhoy Medical School, Poona.—The school year opened with 145 students on the rolls and closed with 159. During the year, 21 students passed out from the school as Sub-Assistant Surgeons, 4 of whom were admitted into the Military and 11 into the Civil branch of the service. 3 were dismissed, 2 resigned and one was allowed to proceed to Alexandria with the staff of the Bombay Presidency War Hospital.

The Byramjee Jeejeebhoy Medical School, Ahmedābad.—Including 2 female pupils, there were 204 students on the rolls. Of this number, 6 were Indian Christians, 16 Jains, 83 Brahmins, 76 other Hindus, 8 Muhammadans and 10 Parsis. One Military and 2 Civil pupils were dismissed for absence without leave. 80 pupils resided in the school hostel.

UNITED PROVINCES.

128. *Medical School, Agra.*—The number of new admissions during the year, *viz.*, 422, including 15 female students, was the highest on the record since the school

was opened in 1854, the increase being due to 330 pupils being admitted into the Military pupil class. There were 113 pupils in the Civil class, 9 in the Rajputana and 20 in the private class and 8 qualifying for compounderships. Including 7 military pupils 24 out of 29 male and 6 out of 6 female students passed the final examination. 44 male and 20 female students appeared for the 3rd year examination and all passed. Two out of 38 male students passed the junior qualifying examination and out of 10 female students all passed the same examination.

The hostel accommodation proved insufficient to house the unprecedentedly large number of admissions and therefore 11 houses had to be hired in the city for the purpose.

PUNJAB.

129. *Medical School, Lahore*.—The number of students on the rolls was 255, of these 60 belonged to the Military Pupil, 15 to the Civil, 15 to the Burma, 2 to the North-West Frontier Province and 13 to the local classes. 95 students appeared for the final examination for the M. P. L. diploma and 87 passed. 37 out of 54 students passed the junior qualifying examination.

Ludhiana Medical School.—5 female students appeared and passed the final examination. All 6 female students who appeared for the junior qualifiying examination failed to pass. This institution is now the provincial school for training women for the Sub-Assistant Surgeon class.

BURMA.

130. There were 75 pupils on the rolls which number includes 7 females. There were 39 male and 3 female Burman students.

8 male and 2 female students appeared for the final examination and with the exception of 1 female student, all passed. 5 out of 7 male students passed the junior examination.

BIHAR AND ORISSA.

131. *Temple Medical School, Patna*.—There were 97 male and 1 female students on the rolls during the year. The following is the result of the examinations :—

	Appeared.	Passed.
Final year	15	11
Junior class	13	12

There were no female candidates for any of these examinations. There were 74 students in the Compounder class. Of 38 male students who appeared for the compoundership examination 25 passed and 4 out of 13 outside candidates passed the compounders examination. There were no female students in the Compounders' class.

Only 3 passed students were recruited into Government service in view of better terms offered by railways and other sources of employment.

Orissa Medical School, Cuttack.—There were 159 male and 6 female students on the rolls during the year:—this number includes 80 in the Compounder class. 32

male pupils appeared for the final examination and 17 passed. 33 male and 4 female pupils appeared for the junior examination of whom 23 and 2, respectively, passed. Out of 47 male students who appeared for the Compoundership examination 37 (including 2 outsiders) passed.

ASSAM.

132. *Berry-White Medical School, Dibrugarh.*—There were 142 students on the rolls during the year. 14 out of 20 students passed the final and 32 out of 44 the junior qualifying examination. Out of 23 regular and 30 outside candidates 20 and 11, respectively, passed the Compounders' examination.

VI.—The X-Ray Institute of India, Dehra Dun.

132-A.—No ordinary classes of instruction were held during the year on account of the war. A modified course lasting one month was however held during February-March, the students attending being Civil Assistant and Sub-Assistant Surgeons and one private student. The total number attending was 10, of whom eight passed, two obtaining special proficiency certificates.

The number of radiographic examinations made was 1,242. 215 cases of disease were under treatment during the year.

Since the end of January the Institute has been undertaking the X-Ray examination and electrical treatment of all cases of wounded men from overseas belonging to the Indian Troops War Hospital, Dehra Dun. Further in September the services of the Institute were offered to the Military Department in connexion with a special St. John Ambulance War Hospital to be opened in Dehra Dun. The offer was gratefully accepted. Localization of severe bullet and shell injuries and the treatment of paralysis and paresis, stiff joints, trench foot and other allied conditions arising from the war are receiving appropriate treatment.

The Branch Installations at Delhi and Simla are both working satisfactorily and are obtaining a large number of patients.

Demands for renewals and replacements received from X-Ray Divisions in the field have been on an unprecedented scale, but so far the Institute has been able in all cases to comply with the requisitions received.

No case of X-Ray traumatism has occurred to any of the staff, students or patients of the Institute.

SECTION VII.

SANITARY WORKS.

INDIA.

133. From the sanitary reserve a sum of Rs. 7·80 lakhs was allotted during 1914-15 on account of Imperial grants for sanitation. From this sum a non-recurring grant of Rs. 3·30 lakhs was made towards the improvement and extension of the sewage system in Simla; one lakh was allotted to the United Provinces for the sanitary improvement of the pilgrim route to Badrinath and Kedarnath, and a similar amount towards the establishment of an experimental sullage farm at Lucknow; two lakhs were allotted for anti-malarial and other sanitary measures in Delhi and a grant of Rs. 20,000 was made to the Bombay Sanitary Association. A recurring grant of Rs. 10,000 a year was made to Hyderabad as a contribution towards sanitary and general improvements of the Residency bazaars.

The following paragraphs contain information regarding sanitary works carried out or in progress in the several provinces.

DELHI.

134. The income of the Delhi Municipality for the year amounted to Rs. 13,37,322. Exclusive of Government grants the actual net income was Rs. 11,40,497 as compared with Rs. 11,10,354 in the previous year. A sum of Rs. 8,04,367 was expended on public health and convenience against Rs. 7,36,889 in 1914-15.

The sanitation of Delhi City shows remarkable improvement. The staff of the Sanitary Department remained the same as in 1914, except that the services of one Circle Inspector were dispensed with and a qualified Sanitary Inspector appointed in his stead. No new large drainage works were undertaken. Steady progress with the erection of water flush latrines continues as sites become available. The work of constructing incinerators and bathing places was continued. Among the important sanitary works undertaken during the year was the removal of *robas*. It may be explained that a *roba* is a masonry shaft, 10 to 20 feet long, through which night-soil passes from the roof of a house to a receptacle placed at the lower end, obviously a most insanitary contrivance and a fruitful breeding place for flies. During the year 250 *robas* were closed and sanitary latrines erected in their stead.

In the Notified Area improvements in drainage were carried out; low ground was filled in; *pucca* drains were made and part of the canal cut was lined. Sanitary defects still abound but are being steadily removed.

BENGAL.

135. The number of municipalities in Bengal as in the previous year was 111. Their total income from all sources, including the opening balance of Rs. 19,05,845 and 'extraordinary and debts' of Rs. 18,31,165, amounted to Rs. 93,64,841 against Rs. 88,64,602 in the previous year. Of this 37·18 per cent was spent on sanitary works against 40·15 per cent in 1914. The decrease is mainly on account of water

supplies due to the fact that abnormally large sums had been spent in this connexion in the previous year.

Of the reserve sanitary grant of 3 lakhs for 1915-16, Rs. 2,99,568 was allotted.

The total expenditure on sanitary works incurred by municipalities, district boards, Government and private individuals amounted to Rs. 22,92,429 against Rs. 17,28,946 in the preceding year. The most important work undertaken was the excavation of a canal at a cost of Rs. 6,47,432 to carry the drainage of the central part of Howrah town. Several new septic tank installations were erected and six were under construction at the close of the year.

Measures for the improvement of village sanitation such as cleaning out filthy tanks, filling of ditches, cleaning of drains, removing refuse and jungle, received considerable attention during the year.

136. *Sanitary Board.*—There was no change in the constitution of the Board. Nine meetings were held during the year. Five sketch projects at an estimated cost of Rs. 7,10,592 were recommended to Government of which four were approved: six detailed schemes were also recommended for final sanction.

Amongst other questions the Board addressed Government on the proposal of the Sanitary Engineer to depute subordinates to England for training in sanitary engineering.

Various sanitary schemes under consideration or in the course of preparation had to be postponed until the end of the war on account of lack of funds.

ASSAM.

137. There were in Assam in 1915, 14 municipalities, 6 unions and one station, an increase of two unions as compared with 1914. Their total income amounted to Rs. 9,74,820 against Rs. 8,56,613 in the previous year: the increase is mainly due to Government grants-in-aid for large improvement schemes. The aggregate expenditure on sanitation during the year was Rs. 2,69,071 or 27·60 per cent of the total income as compared with Rs. 2,29,238 or 28·58 per cent in 1914. Under the orders of the local Government the expenditure on account of 'treatment of the sick' has not, as hitherto, been shown as expenditure on sanitation.

Improvements were effected in urban sanitation in the matter of water-supplies and better supervision of municipal sanitary activity by the appointment of sanitary inspectors in larger towns: this work would have been carried on still further but for financial limitations occasioned by the war.

The balance of the Imperial sanitary grants, recurring and non-recurring, amounted to Rs. 68,000, out of which Rs. 14,357 were allotted for various sanitary improvements. Numerous schemes for piped water-supplies, drainage and town planning were under construction or consideration during the year.

Programmes drawn up by Local Boards for the improvement of water-supplies, to be spread over a period of five years, were approved. Funds amounting to Rs. 1,40,113 were placed at the disposal of the boards for financing the first year's programme. Two-thirds of this sum was contributed by Government, the remainder being found from local funds. The expenditure of Local Boards on rural water-supplies and other minor schemes of village sanitation was much below the amount so spent in 1914, *viz.*, Rs. 1,13,037 against Rs. 2,24,388.

138. *Sanitary Board.*—The Sanitary Board was reconstituted during the year and now consists of the Inspector General of Civil Hospitals as president, the Chief Engineer and the Commissioners of Divisions concerned as members and the Sanitary Commissioner as secretary and member. No formal meeting of the Board was held, all business being transacted by correspondence.

BIHAR AND ORISSA.

139. An expenditure of Rs. 14,77,604 was incurred in municipal towns on sanitary works during the year as compared with Rs. 14,48,054 in 1914. The increase was mainly on account of conservancy, drainage and markets and fairs.

Of the Imperial grant of Rs. 2,89,000 on account of sanitation, Rs. 1,56,063 was distributed during 1915-16. Rs. 15,000 was allotted to the Sanitary Board for the provision of a temporary staff for the preparation of drainage and water-supply projects of municipalities, and Rs. 16,980 on account of temporary establishment required for plague preventive measures. Grants were also made in aid of a scheme for improving methods of registration of vital statistics ; water-supplies in the new capital (Bankipore) and in the Patna and Monghyr municipalities ; and the new vaccine depot.

District Boards expended a sum of Rs. 3,71,868 as compared with Rs. 2,45,803 in the previous year. The main heads under which there was increased expenditure were conservancy, drainage, and water-supply : under the latter head there was an increase of nearly one lakh of rupees.

Two additional Health Officers were appointed during the year. There were altogether nine second class Health Officers, six of whom were appointed during the year after a course of training at Madras. Model rules and standard forms for the guidance and use of Sanitary Inspectors in municipalities were drafted and submitted to Government.

A scheme was drawn up for carrying out a complete sanitary survey of the province, but the work could not be commenced on any large scale owing to the lack of funds and necessary trained staff.

Two Assistant Engineers were appointed during the year and the subordinate engineering staff was reorganized, resulting in increased efficiency of the department. Numerous sanitary improvement schemes were commenced during the year, the most important being water-supply and sewerage schemes for the new capital.

UNITED PROVINCES.

140. The total municipal income of the year amounted to Rs. 88,71,233 against Rs. 99,98,464 in the preceding year. Of this 44 per cent was spent on water-supply, drainage and conservancy. A grant of Rs. 50,000 was as usual made for the improvement of village sanitation in rural tracts.

Out of the grant sanctioned by the Government of India for urban sanitation five and a half lakhs were allotted for sanitary schemes. Of this Rs. 1,20,000 were for the Agra water works and 1,95,000 for the Lucknow Town Planning Emergency Schemes. A further grant of Rs. 80,000 was also made towards the improvement of the water-supply plant at Agra.

141. *Sanitary Board.*—The Sanitary Board held ten meetings during the year. Sanitary schemes of an aggregate cost of Rs. 7,05,410 received the administrative sanction of the Sanitary Board. Many large projects were hampered or held in abeyance for want of adequate funds. The total amount at the disposal of the Board for expenditure on sanitary works aggregated Rs. 6,50,866 of which Rs. 5,89,312 were allotted.

PUNJAB.

142. The system of rewards on account of sanitary improvement does not appear to appeal to the people concerned; at any rate no effort is made to obtain them An income of Rs. 1,28,286 was derived from the sale of street sweepings and Rs. 34,333 was realized from sewage irrigation. Few attempts were made to improve village sanitation as it is extremely difficult to get the villagers to change their customs or habits. Endeavours are being made to remove existing prejudices against sanitary reforms.

143. *Sanitary Board.*—The Board, whose constitution remained the same as in 1914, met three times during the year. The annual grant was enhanced from seven and a half lakhs to eight lakhs and the Sanitary Board would have been able to dispose of the entire grant but for circumstances which resulted in a reduction in the amount and the subsequent withdrawal by Government of Rs. 4,26,564. Of the urban grant of five lakhs allotments to the amount of Rs. 3,56,537 were made during the year, the balance being withdrawn by Government. The most important urban sanitary works undertaken were the Sialkot water-supply scheme and the Dera Ghazi Khan water-supply extension scheme. In accordance with the powers delegated to the Sanitary Board to accord administrative sanction to sanitary schemes the cost of which does not exceed one lakh, the Board approved of 8 drainage schemes and one water-supply scheme during the year. Government accorded technical sanction to five drainage schemes.

NORTH-WEST FRONTIER PROVINCE.

144. During the year little progress was possible in the province with regard to sanitary schemes as the officers of the Public Works Department were 50 per cent under strength on account of the war.

From the balance of the yearly recurring grants of one lakh, Rs. 1,31,000 were allotted to Peshawar City for the provision of improved water-supply and drainage. Towards this the Government of India have sanctioned a grant-in-aid of 5 lakhs of which two lakhs have been allotted. Of the recurring grant of one lakh for 1915, Rs. 60,000 were surrendered, the balance being allotted to the Dera Ismail Khan municipality for paving and draining, and for the construction of infectious diseases camps in the vicinity of all municipal towns.

In all a sum of Rs. 1,66,308 was expended by municipalities and district boards on sanitary works during the year.

CENTRAL PROVINCES AND BERAR.

145. The total income of municipalities for 1914-15 excluding loans and balances was Rs. 33,09,175 against Rs. 31,62,928 in 1913-14. Of this Rs. 17,77,358 or 46 per cent was spent on sanitation.

Municipalities continued to display reasonable activity in the sanitation of towns. A provincial grant of Rs. 4,12,648 was made them during the year for sanitary improvements.

A special grant of Rs. 55,000 was made for improvements to water-supplies in rural areas. Schemes for the provision of good water-supplies at all places where fairs are held and along the routes leading thereto were under consideration.

146. *Sanitary Board.*—The Sanitary Board held four meetings during the year and considered numerous schemes in connexion with water-supply, drainage, &c.

MADRAS.

147. In 1915 the number of municipal towns increased from 64 to 68. The expenditure on the improvement of water-supplies amounted to Rs. 3,14,851 and that on conservancy to Rs. 8,83,857 or 92·8 and 70·6 per cent, respectively, of the allotments under these heads.

There was no change in the number of district boards. Beyond petty improvements to water-supplies, latrines, drains, &c., no sanitary works of any magnitude were undertaken during the year. The allotment for sanitary purposes amounted to Rs. 14,46,771 and the expenditure during the nine months for which figures are available, to Rs. 7,02,072 or 48·5 per cent against 40·8 per cent in 1914: more than 50 per cent of the allotment thus lapsed to Government. The conditions as to water-supply and drainage in rural areas as a whole were more or less the same as in previous years. Two water-supply schemes were in progress and 14 under investigation.

148. *Sanitary Board.*—There was no change in the constitution and functions of the Board. Thirty-two sanitary schemes at an estimated cost of Rs. 12,13,172 were approved during the year. Standard designs were issued for sewage purification arrangements, contagious diseases wards, &c.

COORG.

149. A sum of Rs. 6,156 was expended during the year on certain works connected with the drainage and water-supply of Mercara. Wells were sunk in two *pettas* and repairs were carried out to several wells and tanks in the province.

BOMBAY.

150. There were 157 municipalities in the Bombay Presidency in 1915. The combined municipal income amounted to Rs. 1,24,87,579 of which Rs. 60,67,924 or 48·5 per cent was expended on public health requirements, an increase of Rs. 4,06,204 over the corresponding expenditure of the previous year.

Under the scheme for the appointment of Health Officers and Sanitary Inspectors, three first class and two second class Health Officers and 32 Sanitary Inspectors were appointed.

There were 26 District Local Boards and 216 Taluka Local Boards, the same number as in 1914. Their income amounted to Rs. 84,74,757 and expenditure to Rs. 84,42,463. On water-supplies, drainage and other public health works, Rs. 3,86,398 or less than 5 per cent of the income was spent.

A grant of Rs. 62,000 was made for the improvement of village water-supplies. The allotments were expended in making new tanks and deepening existing ones, in constructing new wells, repairing old ones, &c.

The Imperial grant of Rs. 7 lakhs was distributed among the District Local Boards of the Presidency and Sind and was mainly devoted to the improvement of water supplies, maintenance of medical and veterinary dispensaries and the provision of *dharmshalas*. Allotments were also made by the local Government in connexion with various sanitary works.

151. *Sanitary Board.*—Three meetings of the Board were held during the year to consider water-supply and drainage schemes. The Board sanctioned the preparation of four new projects, mainly in connexion with water-supply: twenty water-supply and drainage schemes were either completed or made progress during the year and 56 others were under investigation.

BURMA.

152. The total income of municipalities and local bodies during 1914-15 was Rs. 1,96,05,306 of which Rs. 57,51,320 was expended on civil sanitary works as compared with Rs. 1,91,25,924 and Rs. 56,52,187, respectively, in 1913-14. The amount spent on water-supply was about Rs. 20 lakhs, on drainage 7 lakhs, conservancy 17 lakhs and on other sanitary works about 13 lakhs.

The whole of the recurring grant of six lakhs for the improvement of urban sanitation together with a balance of Rs. 72,453 from the previous year, was distributed.

153. *Sanitary Board.*—Three meetings of the Board were held at which various sanitary schemes were considered.

MILITARY WORKS.

154. During 1915-16 the expenditure on ordinary original military works, *viz.*, drainage, conservancy, water-supply, hospitals, &c., was Rs. 2,28,562 and on repairs Rs. 5,96,280 against Rs. 2,35,575 and Rs. 6,21,690, respectively, in 1914-15. The expenditure on special military works under the same heads amounted to Rs. 2,05,224 against Rs. 3,98,459.

SECTION VIII.

GENERAL REMARKS.

LABORATORIES.

155. *The Central Research Institute.*—The greater part of the energies of the Institute were, in 1915, devoted to the manufacture and issue of sera and vaccines for which the demands made by the Indian expeditionary forces were very considerable. All demands were satisfactorily complied with, a fact that reflects great credit on the Serum and Vaccine Therapy Section, which for a great part of the year were working under great pressure, with a staff reduced on account of the war. Much greater demands have been dealt with in 1916, but even in 1915 the output was enormously in excess of anything that had till then been accomplished by the Institute.

The greatest demand was for typhoid vaccine the output of which approximated 150,000 c.c. as compared with 55,000 c.c. in the previous year. Cholera vaccine was manufactured and issued in large quantities for the first time; 51,500 c.c. were sent out. This vaccine was prepared from fresh cultures obtained in Calcutta. In the manufacture of these and other vaccines that may be employed for the inoculation of Indian troops, every precaution is taken to ensure that nothing detrimental to caste prejudice is employed in the process; for example beef is never employed in the manufacture of the culture media on which the vaccines are grown. In addition approximately 3,000 c.c. of other stock vaccines were issued and ninety autogenous vaccines were prepared. Fifty thousand c.c. of antivenene and one thousand doses of anti-diphtheritic serum were prepared and issued as well as seven hundred c.c. of other sera.

In addition to the above a large amount of sera imported from England was distributed.

Seven hundred and nine specimens of pathological material, &c., were examined and reported on, including 151 Widal tests, 143 Wassermann tests, 243 blood examinations and 45 tumours.

In spite of this large amount of routine work, a fair amount of research work was done as is evidenced by the fact that sixteen papers were contributed to the *Indian Journal of Medical Research* by workers in the Institute. The equipment of several bacteriological laboratories for service in Mesopotamia has been undertaken by the Institute, which laboratories, we believe, have been of very great value and assistance.

The classes of training in bacteriological technique and malaria investigation, that form an important part of the functions of the Institute in peace time, have been in abeyance on account of the war.

The King Institute of Preventive Medicine, Madras.—Once again a large part of the energies of the staff of this Institute were devoted to the examination of water supplies. One thousand six hundred samples were submitted to either chemical or bacteriological examination. Pathological specimens sent for examination numbered 4,382, which is considerably less than in the previous year. Seven thousand doses of vaccines were manufactured and issued of which 773 were doses of autogenous vaccine (129 such vaccines were made).

The Bombay Bacteriological Laboratory.—This institute still continues to function as a Plague Laboratory for India as well as the Bombay Provincial Laboratory.

The output of anti-plague vaccine was larger in 1915 than in any previous year with the single exception of 1911. Altogether 827,407 doses were despatched. Since the Laboratory was opened in 1896, thirteen million and seventy thousand doses have been supplied. Statistics contained in the Laboratory report demonstrate the efficacy of inoculation as a means for combating a plague epidemic.

Further experiments with hydrocyanic acid gas as a means for destroying vermin (rat-fleas, bugs, etc.) were carried out. A number of different types of machine for generating and distributing the gas were designed and constructed. These machines were tested on a practical scale in houses in Poona City and on bug infested railway carriages. The experiments showed that with suitable precautions, the gas could be used with safety and success. Some of the experiments proved that although a number of rats were killed in the houses by the gas, some which found shelter in deep boxes and barrels survived because the gas did not diffuse into such situations in sufficient concentration during the period the house remained closed. This result is explicable by the fact that the gas is slightly lighter than air. Again rats placed in cages near the roof of some of the houses which were treated with the gas were not killed; here apparently fresh air blown into the room through the comparatively open country tiles sufficed to dilute the gas so that it was no longer harmful to the rats. The action of the gas on insects was more marked than on mammals. Bugs, fleas, cockroaches and mosquitos were readily killed but certain grain weevils were found to be more resistant.

Guinea-worm disease continued to engage the attention of the staff of the Laboratory. Two villages in which the disease has prevailed for many years have been chosen for further experiment and observation. It is proposed to improve the water supply in use in these villages in such a way as to eradicate the disease therein. A new species of guinea-worm was found in the Cobra.

Further investigations have been made in regard to the prevalence of bovine tuberculosis in Bombay. An epidemic of this disease was studied among deer and antelopes confined in the Zoological Gardens in Bombay City.

Although cultures of tubercle bacilli from more than sixty cases of glandular tuberculosis in patients operated upon in the hospitals in Bombay have been obtained and studied, no single strain among these has conformed to the bovine type; all strains were of the human type.

In addition to the manufacture of the plague prophylactic, the laboratory staff were engaged in the examination of pathological material derived from the hospitals throughout the Presidency.

A department has been started for the examination of samples of water used by the municipalities, jails and other public and private institutions in the Presidency.

The laboratory has rendered considerable service during the year to the Military Authorities in the supply of vaccines, disinfectants and apparatus for bacteriological and chemical examinations; as well as assisting with the pathological examination of material derived from the War Hospitals in Bombay.

The Pasteur Institute of India, Kasauli.—A still further increase in the number of patients presenting themselves for treatment at this institute was recorded in 1915. The steady increase in attendance year after year in spite of the multiplication of anti-rabic institutes in India, is evidence of increasing dissemination of knowledge regarding the efficacy of Pasteurian treatment. In the year under report 5,046 patients were treated and an additional 441 persons who presented themselves were advised that treatment was unnecessary in their cases. Of the total treated only 322 were Europeans a lesser number than in the three preceding years. The failure rate was 0·7 per cent. Altogether since the Institute started working in 1900, 30,735 persons have been treated. Several additions and improvements in the Institute buildings, notably a special rabies hospital, an increase in the accommodation for poor patients and the installation of a cold storage plant, have been effected with advantage to both the staff and the patients.

The Pasteur Institute of Southern India, Coonoor.—In 1915-16, 1,490 persons underwent the course of treatment in addition to which 142 persons were advised that treatment was unnecessary. This is a larger number than have been treated in any previous year at this Institute. Since the foundation of the Institute in 1907, 8,180 persons have been treated. Of the total treated in the year under report. 111 were either Europeans or Anglo-Indians. The failure rate amounted to 0·47 per cent.

The Pasteur Institute of Burma, Rangoon.—The institute was inaugurated on August 13th, 1915. The first case for treatment, however, arrived a month earlier, *i.e.*, on the 6th July.

During the year ending 31st July 1916, 451 persons sought advice. Of these 110 were dismissed, as no treatment was deemed necessary in their cases, while 30 did not complete the full course of treatment.

Of the 311 patients subjected to treatment, 199 had been bitten by animals proved to have been rabid: in 112 the risk of infection was more doubtful.

The cases were drawn from the different communities as follows:—European and Anglo-Indian 35, Hindu 135, Mahomedan 60, Burman 90, other classes 21.

The new Government laboratories were amalgamated with the Pasteur Institute and the bacteriological and pathological work hitherto done in them was carried out in that institute. The total number of examinations made in these laboratories during the twelve months ending 3rd of May 1916 amounted to 1,354. In addition 88 examinations of brain for Negri bodies and 2 inoculation tests for rabies were made.

The Indian Research Fund Association.

156. Research work in India has naturally suffered as a result of the continuance of the war. Most of our research workers are employed on military duties, and even those that are left in civil employ are devoting most of their energies to meeting war demands for vaccines or sera or, with greatly reduced staffs, are coping with the essential routine work of the Institutes.

Throughout 1915 Major Greig, I.M.S., continued his important investigations on the subject of cholera. His reports have been published in the *Indian Journal of Medical Research.* The inquiry has now been closed and Major Greig has reverted to military employ.

Further work was also done by Captain Morison I.M.S., in Poona in connexion with the bacteriological examination of water supplies; this inquiry has been completed. The results achieved are important: among other things Captain Morison has demonstrated that the intestinal complaints for which Poona has long had a most unenviable reputation are entirely dependent upon contamination of the water supply that follows rainfall in the catchment area of Lake Fife. Sterilization of the water has already had most beneficial results; as a direct consequence the infant mortality rate of Poona City has fallen in a striking manner. Several reports relating to this inquiry have been published in the Journal.

Dr. A. Lankester has completed the preliminary part of his inquiry into the relative prevalence of tuberculosis in the different parts of India; he has submitted a report which has been circulated to all provincial Governments for criticism of the methods proposed for dealing with the situation. These criticisms are now being considered. On the whole there is little evidence to show that the prevalence of this disease is increasing in India considered as a whole though it is undoubtedly very wide spread.

The inquiry that was started in Poona by Major Kunhardt, I.M.S., dealing with certain aspects of the etiology and prevention of plague epidemics is being continued by Dr. Chitre. Some interesting work has been done in connexion with rat poisons. At present it appears that barium carbonate is the most generally efficient rat poison that has yet been employed.

Major McCay, I.M.S., Professor of Physiology in the Calcutta Medical College, is prosecuting an inquiry on behalf of the Association into the etiology of diabetes in Calcutta; this work is being carried out in addition to his own duties.

Ankylostomiasis or hook-worm disease has been attracting considerable attention. This work has been undertaken partly in response to representations made by the Rockefeller Institute whose activities in connexion with hook-worm disease in all corners of the globe are well known. Inquiries are being prosecuted in the Darjeeling district by Major Clayton Lane, I.M.S., who is working chiefly among the tea garden coolies, and by Dr. Mhasker in Negapatam, Madras, who is devoting most of his attention to the coolies that pass through the emigration depôt there. Both inquiries have already demonstrated how very widespread hook-worm infection is in India; from 60 to 98 per cent of the populations concerned have been found to harbour the parasite.

A chemical investigation of chaulmoogra oil under the supervision of Lieutenant-Colonel Sir Leonard Rogers, I. M. S.; an investigation of the genus *Musca* by Mr. Awati; an inquiry into osteomalacia by Dr. Scott and certain protozoological investigations complete the list of all the purely research activities of the Association that have been possible in the present straitened circumstances regarding personnel.

In spite of the war the official organ of the Association, *The Indian Journal of Medical Research*, has managed to issue a number each quarter. Fourteen numbers have now appeared and from the support that has been accorded to it, it may be assumed that it fulfils a useful purpose. It is a striking record of the interest that is being taken in medical research in India at the present time and of the benefit that medical research is conferring on the people of India.

PILGRIM COMMITTEE.

157. Reference was made in last year's report to the work of the Pilgrim Committees in various Provinces. The reports in Bihar and Orissa, the United Provinces, Madras and Bombay have been completed and submitted to local Governments. They have also been forwarded to the Government of India with a note dealing with the various subjects from the point of view of India as a whole. Action is being taken on these various recommendations in consultation with the bodies concerned.

STATISTICAL TABLES, 1915.

TABLE NO.				PAGES.
I.—	EUROPEAN TROOPS.—	Summary.—	Sickness and Mortality by Geographical Groups.	118-119
II.—	„	„	Ratios of Armies	120
III.—	„	„	„ „ Geographical Groups ...	121
IV.—	„	„	Admission and Death Rates from Enteric Fever in Stations of over 1,000 Strength.	122
V.—	„	„	Statistics of officers.—Sickness and mortality among officers of British Army.	123
VI.—	INDIAN TROOPS.—	Summary.—	Sickness and Mortality by Geographical Groups.	124
VII.—	„	„	Ratios of Armies	125
VIII.—	„	„	„ „ Geographical Groups	126
IX.—	PRISONERS.—	Summary.—	A.—Sickness and Mortality by Administrations.	127
	„	„	B.—Sickness and Mortality by Geographical Groups.	128
X.—	„	Ratios of Administrations	... ...	129
XI.—	„	„	Geographical Groups	130
XII.—	GENERAL POPULATION.—	Provincial Birth and Death Statistics		131
XIII.—	„	„	Births	132
XIV.—	„	„	Deaths	132
XV.—	„	„	„ in Towns and Rural Circles ...	133
XVI.—	„	„	„ according to Age	133
XVII.—	„	„	„ „ „ Cause... ...	134
XVIII.—	„	„	„ by months	135
XIX.—	„	„	Ratio of Deaths according to months	135
XX.—	„	„	Deaths from Cholera, by Provinces, 1884-1915.	136
XXI.—	„	„	„ „ „ months, in 1915	137
XXII.—	„	„	Details of distribution and occurrence of Cholera in 1915.	137
XXIII.—	„	„	Mortality from Small-pox... ...	138
XXIV.—	„	„	„ „ Fever	139
XXV.—	„	„	„ „ Dysentery and Diarrhœa	140
XXVI.—	„	„	„ „ Plague	141
XXVII.—	„	„	„ „ Respiratory Diseases...	142
XXVIII.—	„	„	Vaccination	143

TABLE I.—*Summary.*—*Sickness*

Groups.	Years.	*Average strength.	Constantly sick.	Invaliding.	RATIO PER A.—ADMISSIONS D.—*Deaths*					
					Influenza.		Cholera.		Small-pox.	
					A.	D.	A.	D.	A.	D.
Group I.—Burma Coast and Bay Islands.	1905—1914	1,255	41	†9·4	3·7	...	...	...	·3	...
	1914	1,160	35	12·1	...	...	...	...	...	...
	1915	998	37	11·0	...	...	...	...	...	...
,, II.—Burma Inland ...	1905—1914	1,561	42	†2·1	1·5	...	1·6	1·22	...	...
	1914	1,091	41	...	...	...	...	...	...	...
	1915	579	45	5·2	...	...	...	...	...	...
,, IV.—Bengal and Orissa...	1905—1914	1,862	46	†8·0	6·8	...	·3	...	·5	·05
	1914	1,704	47	8·8	...	...	2·9	...	...	...
	1915	1,220	50	34·4	5·7	...	...	...	...	...
,, V.—Gangetic Plain and Chutia Nagpur.	1905—1914	6,262	38	†9·4	5·7	...	1·1	·62	·9	·02
	1914	4,919	26	10·1	6·9	...	·4	...	1·4	...
	1915	3,374	34	19·9	11·6	...	...	...	...	...
,, VI.—Upper Sub-Himalaya	1905—1914	13,400	41	†8·0	7·1	...	·3	·18	·4	·02
	1914	11,141	34	7·0	3·5	...	·4	·36	·2	·38
	1915	9,410	38	14·2	8·5	...	·1	·11	...	...
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1905—1914	5,156	43	†8·7	36·8	·02	·2	·19	·5	·06
	1914	5,101	38	9·4	·2	...	...	...	...	...
	1915	5,752	39	14·4	2·8	...	1·6	·70	·2	...
,, VIII.—South-Eastern Rajputana, Central India and Gujarat.	1905—1914	5,914	41	†8·9	6·3	...	·1	·08	1·1	·02
	1914	6,404	27	5·2	5·3	...	...	...	...	...
	1915	3,500	39	16·9	4·3	...	...	...	...	...
,, IX.—Deccan	1905—1914	10,534	36	†6·4	2·1	...	·5	·35	·6	·02
	1914	9,267	29	6·3	·8	...	1·0	·54	...	...
	1915	6,798	39	39·9	17·9	...	...	...	·3	...
,, X.—Western Coast ...	1905—1914	1,480	45	†8·9	2·4	...	·1	...	·6	...
	1914	1,519	34	3·3	3·3	...	...	...	...	...
	1915	1,170	46	49·6	10·3	...	...	...	...	...
,, XI.—Southern India ...	1905—1914	3,441	42	†7·6	3·3	...	·2	·06	·7	·03
	1914	2,869	18	3·8	·3	...	·7	·35	·7	...
	1915	1,254	40	30·3	7·2	...	...	...	·8	...
,, XII (*a*).—Hill Stations ...	1905—1914	11,660	31	†5·4	5·5	...	·1	...	·1	...
	1914	10,039	28	2·8	4·6	...	...	...	...	...
	1915	6,593	38	10·3	4·5	...	·9	·45	...	...
,, XII (*b*).—Hill Convalescent Depôts and Sanatoria.	1905—1914	3,648	52	†9·3	1·7	...	·1	·08	·2	·03
	1914	3,225	40	3·7	1·5	...	...	·31	·3	...
	1915	2,427	53	16·9	1·6	...	...	...	...	...
India	1905—1914	69,846	39	†7·4	7·1	·00	·3	·27	·5	·02
	1914	60,581	32	6·0	2·9	...	·4	·18	·2	...
	1915	44,891	39	19·8	7·4	...	·4	·18	·1	...

* The decennial ratios are worked on the total strength of the ten-year period.
† From 1909 to 1914.

and mortality by Geographical Groups, 1915.

MILLE OF STRENGTH.

FROM

from

Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Venereal diseases.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
·6	·16	61·1	·48	126·7	·08	1·3	·16	13·5	·80	128·3	·32	706·0	7·57
...	...	29·3	...	3·4	...	1·7	...	...	...	107·8	·86	499·1	6·90
...	...	332·7	1·00	60·1	...	1·0	...	...	...	55·1	...	950·9	2·00
3·0	·70	91·8	·19	76·6	...	1·5	·38	7·4	·26	124·1	·13	737·8	5·83
...	...	63·0	...	18·4	...	1·9	...	5·8	...	117·4	...	637·7	1·94
...	...	46·6	...	5·2	...	1·7	...	5·2	...	34·5	...	1,024·2	1·73
4·0	·59	125·1	·16	69·2	...	3·1	·81	11·5	·32	140·2	·11	720·6	9·24
·6	...	190·7	...	21·1	...	·6	...	3·5	...	112·7	...	900·8	8·22
2·5	...	159·8	1·64	13·1	...	·8	...	8·2	·82	42·6	...	1,156·6	9·01
12·3	2·01	80·7	·14	75·0	·03	3·7	·43	11·1	·42	83·5	·02	657·4	8·24
5·1	·41	36·2	...	45·7	·20	7·5	1·22	9·1	...	51·0	...	575·7	5·08
11·0	·59	16·9	·30	6·2	...	1·8	·59	5·0	·89	16·0	...	756·7	8·89
10·1	1·68	209·1	·31	43·6	·01	3·8	·39	6·9	·25	66·8	·04	782·9	7·16
3·8	·45	247·4	·27	8·8	...	3·9	·08	6·0	...	48·6	...	746·9	4·85
3·0	·11	172·5	·21	7·6	...	1·9	·32	3·7	·21	28·1	·11	824·0	4·78
7·7	1·63	319·3	·45	61·0	·06	4·4	·37	4·8	·06	61·0	·06	985·6	7·33
1·8	·59	398·4	1·18	23·3	·39	2·7	·59	1·6	...	37·4	·39	933·0	6·27
1·7	·35	224·9	·35	21·7	...	4·7	1·22	2·1	...	33·0	...	890·0	8·70
10·7	2·79	233·4	·27	19·7	...	2·8	·25	10·0	·32	81·2	·05	778·9	7·78
2·3	·47	84·6	...	4·5	...	1·4	·16	4·1	...	56·4	...	481·6	3·12
10·0	1·71	84·6	·29	10·0	...	2·9	·57	5·1	...	44·3	...	713·7	8·57
11·6	1·92	97·4	·10	25·3	...	2·2	·22	15·9	·33	81·6	·05	572·2	6·37
4·4	...	112·3	·11	·9	...	1·5	·22	10·2	·11	59·7	...	467·5	3·84
1·6	·44	117·7	·59	2·4	...	2·4	...	10·6	·29	25·7	...	852·3	4·41
2·8	·61	152·0	·27	9·6	...	2·1	·54	11·4	·20	139·5	·14	642·0	6·49
3·9	...	128·4	...	·7	...	2·6	1·97	13·8	1·32	117·2	...	610·3	6·58
1·7	...	117·9	...	3·4	...	·8	...	11·1	...	73·5	...	833·3	4·27
9·4	1·22	66·0	·09	24·1	...	2·0	·29	16·0	·15	118·5	·06	702·0	5·41
3·1	...	73·5	...	4·9	...	3·5	...	8·0	...	63·4	...	475·1	3·14
4·0	...	32·7	...	7·2	...	2·4	...	8·0	·80	36·7	...	901·9	8·77
5·8	·95	88·9	·13	24·7	...	2·4	·38	5·5	·26	53·6	·12	531·6	4·49
1·9	...	135·9	...	6·6	...	1·7	·10	3·5	·20	33·6	·10	500·0	2·59
3·0	...	247·5	·15	8·0	...	2·7	·15	1·5	·15	22·9	...	798·3	3·79
7·0	1·10	142·0	·19	17·2	...	2·5	·25	9·7	·44	69·9	·16	686·3	7·54
·9	...	194·1	...	5·0	...	2·8	...	5·6	1·24	41·9	...	604·6	6·20
4·9	·41	145·4	...	4·5	...	3·7	·82	17·3	·82	11·1	...	750·7	6·59
8·5	1·52	148·1	·21	39·0	·01	3·0	·33	9·8	·29	77·6	·07	686·2	6·66
2·9	·21	162·8	·16	10·7	·05	2·8	·28	6·2	·16	55·2	·07	614·5	4·22
3·7	·36	154·5	·36	9·8	...	2·7	·38	5·6	·29	29·1	·02	823·1	5·25

TABLE NO. 11.—*RATIOS OF ARMIES, 1915.*

	Ratios per 1,000 of the average strength.		
	Northern Army.	Southern Army.	India.
I.—STRENGTH	23,774	20,192	44,891
II.—CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH	39·6	40·2	39·1
III.—ADMISSION RATE OF THE YEAR—			
Influenza	6·1	9·3	7·4
Cholera	·7	...	·4
Small-pox	·0	·2	·1
Enteric Fever	4·1	3·5	3·7
Malaria	166·2	145·1	154·5
Sandfly Fever	69·7	9·0	41·1
Pyrexia of uncertain origin	11·7	7·5	9·8
Tubercle of the Lungs	·6	1·7	1·1
Pneumonia	2·4	2·9	2·7
Respiratory Diseases	23·3	19·7	21·3
Dysentery	4·4	7·1	5·6
Diarrhœa	28·8	24·4	26·5
Hepatic Abscess	·6	·4	·5
„ Congestion and Inflammation	13·5	3·0	8·5
Venereal Diseases	25·5	34·1	29·1
ALL CAUSES	921·0	831·8	823·1
IV.—DEATH RATE OF THE YEAR—			
Cholera	·24	...	·18
Small-pox	...	...	...
Enteric Fever	·21	·54	·36
Malaria	·34	·40	·36
Pyrexia of uncertain origin	...	...	...
Heat-stroke	·97	·50	·74
Circulatory Diseases	·42	·45	·42
Tubercle of the Lungs	·08	·15	·11
Pneumonia	·50	·25	·38
Respiratory Diseases	·04	·10	·07
Dysentery	·34	·25	·29
Diarrhœa	...	...	...
Hepatic Abscess	·21	·20	·20
ALL CAUSES	6·48	5·40	5·95

* Worked on the aggregates.

EUROPEAN TROOPS.

TABLE No. III.—*Ratios of Geographical Groups, 1915.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.W.-Frontier, Indus Valley, and N.W.-Rajputana.	VIII S. E. Rajputana, Central India and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII*a* Hill Stations.	XII*b* Hill Convalescent Depôts and Sanatoria.	India.
I.—STRENGTH	998	579	1,220	3,374	9,410	5,75	3,500	6,798	1,170	1,254	6,593	2,427	44,891
II.—†CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH ...	36·7	45·1	49·7	34·0	38·4	39·2	39·5	39·4	45·6	39·9	37·9	52·8	39·1
III.—ADMISSION RATE OF THE YEAR—													
Influenza	...	...	5·7	11·6	8·5	2·8	4·3	17·9	10·3	7·2	4·5	1·6	
Cholera	...	...	...	...	·1	1·6	...	...	...	...	·9	...	
Small-pox	...	...	...	...	...	·2	...	1·3	...	·8	...	...	·1
Enteric Fever	...	...	2·5	11·0	3·0	1·7	10·0	1·6	1·7	4·0	3·0	4·9	3·7
Malaria	332·7	46·6	159·8	16·9	725	224·9	84·6	117·7	117·9	32·7	247·5	145·4	154·5
Sandfly Fever	...	...	...	33·2	59·3	163·0	26·9	7·2	...	...	3·8	·8	41·1
Pyrexia of uncertain origin ...	60·1	5·2	13·1	6·2	7·6	21·7	10·0	2·4	3·4	7·2	8·0	4·5	9·8
Rheumatic Fever	8·0	13·8	8·2	7·7	8·0	4·3	11·1	12·9	21·4	38·3	17·3	16·9	11·5
Tubercle of the Lungs ...	1·0	...	·8	1·2	·5	·5	2·6	1·0	3·4	3·2	·8	2·1	1·1
Pneumonia	1·0	1·7	·8	1·8	1·9	4·7	2·9	2·4	·8	2·4	2·7	3·7	2·7
Respiratory Diseases ...	20·0	17·3	50·8	18·4	27·1	22·6	18·6	17·1	32·5	30·3	14·7	18·5	21·3
Dysentery	...	5·2	8·2	5·0	3·7	2·1	5·1	10·6	11·1	8·0	1·2	17·3	5·6
Diarrhœa	21·0	24·2	46·7	41·2	25·0	23·8	26·9	29·7	13·7	27·9	21·7	16·1	26·5
Hepatic Abscess	...	...	...	·9	·6	·2	·6	·1	...	1·6	·8	·8	·5
Hepatic Congestion and Inflammation ...	2·0	12·1	18·9	38·5	7·0	9·2	7·7	3·1	3·4	4·0	4·5	3·7	8·5
Venereal Diseases	55·1	34·5	42·6	16·0	28·1	33·0	44·3	25·7	73·5	36·7	22·9	11·1	29·1
ALL CAUSES ...	930·9	1,024·2	1,156·6	756·7	824·0	890·0	713·7	852·3	833·3	901·9	798·3	750·7	823·1
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	·11	·70	...	...	...	...	·45	...	·18
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	...	...	...	·59	·11	·35	1·71	·44	...	...	...	·41	·36
Malaria	1·00	...	1·64	·30	·21	·35	·29	·59	...	...	·15	...	·36
Pyrexia of uncertain origin ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Heat-stroke	...	...	·82	1·79	·74	1·74	·86	·44	·85	·80	...	...	·74
Circulatory Diseases ...	...	1·73	·82	...	32	·87	·29	·29	1·71	...	·45	...	·42
Tubercle of the Lungs ...	...	...	...	...	...	...	·29	·15	·85	...	·15	·41	·11
Pneumonia	...	...	...	·59	·32	1·22	·57	...	...	...	·15	·82	·38
Respiratory Diseases ...	...	...	...	...		...	...	...	...	·80	·15	...	·07
Dysentery	...	...	·82	·89	·21	...	...	·29	...	·80	·15	·82	·29
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatic Abscess	...	...	...	·59	·21	...	·29	·15	...	1·59	...	...	·20
ALL CAUSES ...	2·00	1·73	9·01	8·89	4·78	8·70	8·57	4·41	4·27	8·77	3·79	6·59	5·95

† Worked of the aggregates.

TABLE No. IV.—*Admission and death rates from Enteric fever in stations of over 1,000 strength.*

Stations.	1915.		Decennium 1905-1914.	
	Admission rate per 1,000.	Death rate per 1,000.	Admission rate per 1,000.	Death rate per 1,000.
Peshawar	2·8	1·11	12·9	2·50
Nowshera	·9	...	6·4	2·49
Rawalpindi	2·6	...	11·1	1·70
Meerut	...	...	16·0	3·09
Lucknow	15·9	·76	15·4	2·50
Quetta	2·8	...	6·8	1·33
Mhow	9·0	·75	11·5	2·50
Jhansi	18·4	4·60	17·5	5·17
Jubbulpore	2·8	1·89	9·7	1·91
Poona	2·3	...	14·7	1·60
Secunderabad	·5	...	12·9	2·55

TABLE No. V.—*Statistics of Officers.*

SICKNESS AND MORTALITY AMONG OFFICERS OF THE BRITISH ARMY IN 1915.

	Officers.		
	Northern Army.	Southern Army.	India.
STRENGTH	1,028	963	2,080
CASES REMAINING FROM 1914	21·4	17·6	18·7
CONSTANTLY SICK	25·75	25·77	24·67
INVALIDING	11·67	31·15	20·19
ADMISSIONS.			
Influenza	10·7	18·7	13·9
Measles	...	1·0	·5
Whooping cough	...	...	...
Enteric Fever	5·8	2·1	3·8
Malaria	58·4	46·7	51·0
Sandfly Fever	82·7	24·9	52·4
Pyrexia of uncertain origin	9·7	8·3	10·6
Tubercle of the lungs	1·0	2·1	1·4
Tuberculosis Diseases	1·0	...	·5
Pneumonia	2·9	...	1·4
Respiratory Diseases	41·8	26·0	32·7
Dysentery	7·8	14·5	10·6
Diarrhœa	46·7	45·7	44·2
Hepatic Abscess	1·0	...	·5
„ Congestion	4·9	4·2	4·3
Eye Diseases	3·9	10·4	6·7
Anæmia and Debility	8·8	12·5	10·1
Abortion and other affections	...	...	...
Affections connected with and consequent on parturition	...	...	...
All other diseases peculiar to women	...	...	...
Venereal Diseases	3·9	4·2	3·8
ALL CAUSES	726·6	721·7	694·2
DEATHS.			
Diphtheria	...	...	...
Enteric Fever	·97	...	·48
Heat-stroke	1·95	...	·96
Circulatory Diseases	...	...	...
Tubercle of the Lungs	...	...	...
Convulsions	...	...	...
Respiratory Diseases	...	...	...
Dysentery	...	1·04	·48
Diarrhœa	...	...	...
Hepatic Abscess	...	...	...
Anæmia, Debility and Premature birth	...	...	...
Abortion and affections connected with and consequent on parturition	...	...	...
ALL CAUSES	7·78	7·27	7·21
TOTAL INCLUDING DEATHS IN ENGLAND AND OTHER COUNTRIES	...	...	7·69

TABLE No. VI.—*Summary—Sickness and Mortality by Geographical Groups.*

RATIO PER MILLE OF STRENGTH.

GROUPS.	Years.	Average strength.	Constantly sick.	Invaliding.	A.—ADMISSIONS FROM / D.—DEATH FROM: Influenza. A.	Influenza. D.	Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Enteric fever. A.	Enteric fever. D.	Malaria. A.	Malaria. D.	Pyrexia of uncertain origin. A.	Pyrexia of uncertain origin. D.	Pneumonia. A.	Pneumonia. D.	Dysentery. A.	Dysentery. D.	Venereal diseases. A.	Venereal diseases. D.	All causes. A.	All causes. D.
Group I.—Burma Coast and Bay Islands.	1905-1914	1,366	23·0	...	·8	...	...	...	·1	...	...	...	120·5	·51	103·1	·15	3·7	·59	3 3·6	·07	19·2	...	661·8	3·81
	1914	1,345	21·6	...	...	...	...	...	...	...	...	...	61·7	...	236·4	...	5·2	...	12·6	...	27·5	...	745·7	1·49
	1915	742	35·0	...	...	...	...	...	...	...	...	...	296·5	2·70	109·2	...	2·7	...	8·1	...	71·4	...	913·7	6·74
„ II.—Burma Inland	1905-1914	2,672	23·6	...	2·6	...	...	...	·2	...	·9	·34	189·5	·79	51·1	·15	2·8	·67	15·4	·07	13·8	...	617·0	4·23
	1914	2,239	29·9	...	...	...	...	...	...	...	4·0	3·57	300·1	1·34	64·8	...	4·0	...	4·9	...	21·9	...	778·0	8·93
	1915	2,721	43·0	...	...	...	·4	...	...	...	...	...	342·9	3·31	4·9	·37	7·0	1·84	10·3	...	49·6	...	994·5	12·50
„ III.—Assam ...	1905-1914	1,038	25·4	...	2·0	...	·2	·19	·2	...	·4	·19	251·3	·58	28·0	...	8·4	·67	33·8	·19	23·2	...	772·7	3·47
	1914	1,915	24·5	...	6·8	...	...	...	·5	...	·5	·52	132·1	·52	62·7	...	7·3	·52	51·7	...	12·0	...	631·3	2·09
	1915	706	32·6	...	4·2	...	...	...	...	...	4·2	...	68·0	...	85·0	...	2·8	...	22·7	...	29·7	...	660·1	1·42
„ IV.—Bengal and Orissa	1905-1914	2,161	26·5	...	1·9	...	·2	·23	·1	...	·8	·23	208·3	·56	62·5	·19	7·5	1·02	48·2	·32	21·8	·05	738·7	4·81
	1914	2,009	27·9	...	...	...	·5	...	·5	...	1·5	...	69·1	...	43·8	...	5·0	·56	33·3	...	26·9	...	908·4	1·00
	1915	1,207	63·0	...	4·1	...	...	...	...	...	...	...	67·9	·83	159·1	...	6·6	·83	55·5	...	61·3	...	988·4	3·31
„ V.—Gangetic Plain and Chutia Nagpur	1905-1914	6,220	18·7	...	2·5	...	9	·43	·5	·03	·8	·23	103·9	·43	29·2	·11	7·9	1·32	28·3	·23	14·8	·05	515·9	5·10
	1914	5,491	22·1	...	3·6	...	1·1	·18	1·8	·18	·2	...	22·0	1·18	61·6	...	6·6	1·09	9·8	...	16·9	...	503·4	3·46
	1915	6,753	24·7	...	·3	...	·6	·44	·3	...	1·5	·30	24·0	·44	10·7	...	6·7	1·78	9·9	·15	25·0	...	463·3	8·00
„ VI.—Upper Sub-Himalaya.	1905-1914	20,938	22·2	...	3·1	...	·3	·18	·5	·02	2·4	·53	158·7	·44	30·3	·11	11·0	1·83	22·2	·10	16·1	·04	582·9	5·98
	1914	20,693	21·9	...	·6	...	·4	·19	·3	...	2·9	·29	89·1	·29	35·1	·10	10·0	1·50	11·5	·05	14·9	·05	537·6	4·42
	1915	24,061	34·2	...	·2	...	·3	·12	·2	...	2·1	·62	102·7	·37	36·5	·37	16·0	2·78	20·4	·08	36·9	...	685·6	7·11
„ VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1905-1914	18,467	26·5	...	5·2	...	·4	·26	·5	·0 2	2·3	·42	312·9	·46	22·7	·12	15·1	2·56	34·9	·13	9·6	·03	857·2	6·27
	1914	18,791	24·6	...	·1	...	1·6	·64	·1	...	1·5	·16	208·0	·32	50·2	·27	10·2	1·92	16·8	·16	12·1	...	781·6	5·75
	1915	28,791	35·0	...	·2	...	1·2	·49	·2	...	4·4	1·04	144·1	·90	30·6	·35	18·7	4·10	37·2	·24	23·8	·03	811·5	10·11
„ VIII.—South-Eastern Rajputana, Central India and Gujarat.	1905-1914	11,940	19·9	...	1·9	...	·3	·15	·8	·02	2·0	·45	185·3	·39	13·4	·07	9·8	1·42	21·4	·08	14·3	·03	572·2	4·99
	1914	9,763	19·1	...	3·4	...	·4	·41	·2	...	1·6	·51	74·3	·41	29·7	·20	6·8	1·13	13·5	...	12·4	...	483·4	4·81
	1915	7,570	33·3	...	1·2	...	·1	·13	...	...	1·1	·13	65·5	·26	5·9	...	10·8	1·32	14·3	...	29·2	...	772·3	4·36
„ IX.—Deccan ...	1905-1914	17,064	19·0	...	3·4	·01	1·1	·62	·9	·02	2·0	·39	74·1	·24	29·4	·08	6·9	·94	24·7	·10	23·2	·04	473·9	4·84
	1914	14,931	20·5	...	2·4	...	·9	·33	·3	...	1·3	·32	53·3	·07	7·6	...	5·8	·94	15·7	·20	28·0	...	498·1	4·29
	1915	11,009	43·5	...	2·4	...	...	...	·7	...	1·0	·13	104·7	·27	4·2	·18	6·5	1·18	21·6	·18	55·0	·18	804·4	5·81
„ X.—Western Coast	1905-1914	1,806	46·9	...	1·8	...	·2	·17	·8	·06	1·5	·66	220·5	·89	21·5	·17	8·7	2·27	63·1	·55	30·3	·06	778·5	6·63
	1914	1,951	26·1	...	1·0	...	·5	·51	1·0	...	2·6	·51	183·0	·51	14·9	...	8·2	...	43·1	...	30·8	...	597·1	4·10
	1915	1,192	40·3	...	...	...	...	...	2·5	...	1·7	...	199·7	...	1·7	...	12·6	2·52	45·3	·84	82·2	...	820·5	3·36
„ XI.—Southern India	1905-1914	4,756	19·7	...	1·7	...	·8	·55	·5	·04	·7	·06	126·7	·21	23·4	·06	6·3	·82	21·0	·23	24·6	·06	506·7	5·19
	1914	3,922	21·2	...	1·5	...	·5	·51	...	...	1·5	...	48·4	...	1·5	...	5·6	1·53	5·1	...	28·0	·25	573·0	4·59
	1915	2,896	33·1	...	...	...	·3	...	1·0	...	2·1	...	69·1	...	·7	...	9·3	·35	3·5	...	62·5	...	673·3	4·14
„ XII.—Hill Stations...	1905-1914	22,490	23·8	...	4·0	·01	·3	·19	·2	·04	2·6	·56	16·0	·64	32·3	·10	11·3	1·78	21·3	·16	15·0	·03	599·3	7·47
	1914	21,680	23·3	...	1·1	...	·1	·09	·1	...	2·0	·46	135·8	·23	42·9	·14	8·2	1·06	6·5	·09	12·3	·09	623·5	4·29
	1915	24,896	30·3	...	4·5	...	1·3	1·00	·2	...	1·1	·32	201·3	2·85	8·1	·12	12·8	5·05	15·6	·44	18·6	·04	688·2	12·41
ARMY OF INDIA ...	1905-1914	128,759	21·5	6·08	3·2	·00	·4	·27	·4	·02	1·8	·38	167·7	·45	27·5	·09	9·7	1·47	26·5	·14	15·6	·03	590·6	3·57
	1914	125,074	20·9	7·36	1·3	...	·6	·26	·3	·01	1·6	·33	112·8	·23	35·5	·12	7·3	1·09	14·2	·08	15·6	·03	566·5	4·17
	1915	119,985	33·9	...	2·2	·01	·7	·38	·3	...	2·2	·51	148·5	1·08	22·3	·32	12·9	2·62	22·6	·20	31·3	·03	744·4	8·55

TABLE No. VII.—*Ratios of Armies, 1915.*

	Ratio per 1,000 of the Average Strength.		
	Northern Army.	Southern Army.	Army of India.*
I.—Average Annual Strength	71,842	42,631	119,985
II.—Constantly Sick	34·4	34·9	33·9
III.—Admission Rate of the Year—			
Influenza	1·9	·8	2·2
Cholera	1·1	·0	·7
Small-pox	·2	·3	·3
Enteric fever	2·9	1·1	2·2
Malaria	137·3	166·9	148·5
Sandfly Fever	18·5	7·6	13·9
Pyrexia of uncertain origin	30·3	7·5	32·3
Plague	·2	·2	·2
Tubercle of the Lungs	3·2	2·2	2·8
Pneumonia	16·0	8·7	12·9
Respiratory Diseases	40·4	45·6	42·2
Dysentry	27·5	15·1	22·6
Diarrhœa	15·9	22·9	18·2
Hepatic { Abscess	·1	·0	·1
Hepatic { Congestion and Inflammation	·9	1·7	1·2
Scurvy	1·8	2·5	2·0
Venereal Diseases	27·5	38·7	31·3
All Causes ...	740·4	771·9	744·4
IV.—Death rate of the year—			
Cholera	·64	...	·38
Small-pox	...	...	...
Enteric Fever	·74	·14	·51
Malaria	1·38	·66	1·08
Sadfly Fever	...	...	...
Pyrexia of uncertain origin	·29	·1	·22
Plague	·03	·14	·07
Circulatory Diseases	·22	·40	·28
Tubercle of the Lungs	·40	·21	·32
Pneumonia	3·26	1·71	2·62
Respiratory Diseases	·33	·38	·33
Dysentery	·24	·16	·20
Diarrhœa	·35	·05	·23
Hepatic Abscess	07	...	·04
Anæmia and Debility	·10	·09	·11
All Causes ...	10·08	6·52	8·55

* Including Group Extra India, Field Forces and troops on the line of march.

TABLE NO. VIII.—*Ratios of Geographical Groups, 1915.*

	RATIO PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India, and Gujarat.	IX Deccan.	X Western Coast.	XI Southern India.	XII Hill Stations.	Army of India.*
I.—AVERAGE ANNUAL STRENGTH ...	742	2,721	706	1,207	63753	24,061	28,791	7,570	11,009	1,192	2,896	24,896	119,985
II.—CONSTANTLY SICK PER 1,000 OF THE AVERAGE STRENGTH....	35·0	43·0	32·6	63·0	24·7	34·2	35·0	33·3	43·5	40·3	33·1	30·3	33·9
III.—ADMISSION RATE OF THE YEAR.													
Influenza	...	...	4·2	4·1	·3	·2	·2	1·2	2·4	...	...	4·5	2·2
Cholera	...	·4	...	....	·6	·3	1·2	·1	...	...	·3	1·3	·7
Small-pox	...	...	...	...	·3	·2	·2	...	·7	2·5	1·0	·2	·3
Enteric Fever	...	...	4·2	...	1·5	2·1	4·4	1·1	1·0	1·7	2·1	1·1	2·2
Malaria	296·5	342·9	68·0	67·9	24·0	102·7	114·1	65·5	104·7	199·7	69·1	201·3	148·5
Sandfly Fever	...	...	...	...	·4	·2	38·8	15·1	1·5	...	...	8·6	13·9
Pyrexia of uncertain origin ...	109·2	4·0	85·0	159·1	10·7	36·5	30·6	5·9	4·2	1·7	·7	8·1	22·3
Plague	...	·7	...	...	...	·5	·0	·1	·4	...	·7	·0	·2
Tubercle of the Lungs ...	1·3	2·6	2·8	...	3·4	3·9	2·4	2·9	2·6	5·0	2·8	2·4	2·8
Pneumonia	2·7	7·0	2·8	6·6	6·7	16·0	18·7	10·8	6·5	12·6	9·3	12·8	12·9
Respiratory Diseases ...	10·8	45·2	32·6	90·3	33·8	34·9	47·4	55·2	53·2	46·1	25·6	38·8	42·2
Dysentery	8·1	10·3	22·7	55·5	9·9	20·4	37·2	14·3	21·6	45·3	3·5	15·6	22·6
Diarrhœa	1·3	25·7	38·2	8·3	11·1	13·9	17·2	12·0	19·5	23·5	11·7	19·5	18·2
Hepatic Abscess ...	1·3	...	1·4	...	...	...	·1	...	...	...	...	·2	·1
Hepatic Congestion and Inflammation ...	1·3	1·8	...	2·5	1·6	·9	·7	1·1	1·5	2·5	2·4	1·1	1·2
Scurvy	...	...	...	1·7	·1	·2	5·2	·8	2·7	1·7	...	·9	2·0
Venereal Diseases	71·4	49·6	29·7	61·3	25·0	36·9	23·8	29·2	55·0	82·2	62·5	18·6	31·3
ALL CAUSES ...	913·7	994·5	660·1	988·4	463·3	685·6	811·5	772·3	804·4	820·5	673·3	688·2	744·4
IV.—DEATH RATE OF THE YEAR—													
Cholera	...	...	...	...	·44	·12	·49	·13	...	...	...	1·00	·38
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	...	...	...	...	·30	·62	1·04	·13	·18	...	...	·32	·51
Malaria	2·70	3·31	...	·83	·44	·37	·90	·26	·27	...	...	2·85	1·08
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	...	·37	...	...	...	·37	·35	...	·18	...	...	·12	·22
Plague	...	·37	...	...	...	·08	...	...	·27	....	·69	...	·07
Circulatory Diseases ...	...	·10	...	...	·59	·08	·17	·40	·55	...	·35	·36	·28
Tubercle of the Lungs ...	...	·37	...	...	·44	·33	·10	·13	·27	...	...	·76	·32
Pneumonia	...	1·84	...	·83	1·78	2·78	4·10	1·32	1·18	2·52	·35	3·05	2·62
Respiratory Diseases ...	...	·37	...	·83	·30	·29	·42	·40	·27	...	...	·44	·33
Dysentery	...	...	...	...	·15	·08	·24	...	·18	·84	...	·44	·20
Diarrhœa	...	...	...	...	·15	·12	·14	...	·09	...	...	·68	·23
Hepatic Abscess	...	...	1·42	...	...	...	·07	...	...	...	...	·08	·04
Anæmia and Debility ...	...	...	...	...	·59	...	·10	...	·09	...	...	·08	·11
ALL CAUSES ...	6·74	12·50	1·42	3·31	8·00	7·11	10·11	4·36	5·81	3·36	4·14	12·41	8·55

* Including Group Extra India, Field Forces and troops on the line of march.

TABLE No. IX—PART I.—*Summary, Sickness and mortality.*—*1915.*

Administrations.	Years.	Average Strength.†	Constantly sick.	RATIO PER MILLE OF STRENGTH.* A.—ADMISSIONS D.—DEATHS. FROM Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Malaria. A.	Malaria. D.	Tubercle of the lungs. A.	Tubercle of the lungs. D.	Pneumonia. A.	Pneumonia. D.	Respiratory diseases. A.	Respiratory diseases. D.	Dysentery. A.	Dysentery. D.	Diarrhœa. A.	Diarrhœa. D.	Anæmia and Debility. A.	Anæmia and Debility. D.	All causes. A.	All causes. D.
Burma	1905-14	14,808	15	·9	·59	·3	·05	36·9	·36	7·2	3·80	3·4	1·01	11·5	·56	19·1	1·57	10·0	·28	3·3	·17	288·2	15·28
	1914	16,652	15	·1	·06	·1	...	23·0	·30	7·9	4.20	5·1	1·68	·11·0	·96	16·0	1·38	7·1	·06	4·3	...	269·9	17·66
	1915	17,474	16	·7	·80	...	...	30·7	·29	7·8	4·86	3·0	1·20	11·4	·97	24·3	1·66	7·2	·11	5·0	·11	291·3	20·09
Assam	1905-14	1,617	38	2·9	1·36	·2	·06	289·8	3·59	6·2	2·78	11·4	3·84	25·2	1·30	210·9	12·25	93·7	1·18	19·2	2·47	979·4	39·84
	1914	1,772	45	3·4	1·13	·6	...	200·9	3·39	8·5	2·82	9·0	4·51	37·8	1·69	333·0	16·93	158·0	...	19·2	·56	1,182·8	43·45
	1915	1,901	52	·5	...	...	...	69·4	1·58	3·7	2·10	7·9	1·58	29·5	·53	137·8	4·73	132·0	·53	6·8	...	965·3	21·57
Bengal	1905-14	11,600	44	·9	·62	·5	·07	269·3	1·73	13·2	4·22	10·4	2·84	36·4	1·13	187·5	5·36	98·7	·79	18·0	·73	978·8	23·90
	1914	11,705	49	·4	·26	·1	...	317·5	1·37	10·4	4·36	9·7	2·14	39·5	·85	167·3	4·53	121·7	·68	26·4	·77	1,060·8	22·55
	1915	13,435	56	·3	·07	·5	·15	332·0	1·71	10·0	2·83	9·5	2·02	35·1	·97	215·5	6·10	138·3	1·71	23·0	·37	1,248·9	21·21
Bihar and Orissa	1905-14	7,799	32	2·2	1·17	·9	·10	241·5	1·18	10·0	3·54	6·9	1·91	29·1	·56	137·5	5·53	87·3	1·05	13·5	·71	830·3	22·95
	1914	6,525	30	·3	·31	·3	·15	148·7	·61	11·5	3·68	4·1	1·53	27·6	·31	81·1	3·07	76·0	·77	16·4	·31	734·3	17·62
	1915	7,146	32	2·2	·84	1·3	...	123·3	·84	9·0	3·78	6·4	3·50	28·4	·84	123·8	7·00	82·4	1·68	26·7	·98	742·4	25·75
United Provinces of Agra and Oudh.	1905-14	24,512	26	·6	·34	·8	·06	158·1	·89	7·1	2·42	13·8	3·06	21·2	·88	33·3	2·29	20·4	1·01	8·2	·22	520·4	16·37
	1914	24,912	21	1·4	·80	·7	...	72·3	·64	7·1	1·93	11·1	1·81	21·4	·56	26·7	1·24	17·8	·56	7·5	·08	396·9	11·95
	1915	27,020	21	·1	·07	·2	...	93·3	1·04	6·8	2·44	11·3	2·07	23·2	·41	28·0	2·15	17·0	·96	7·2	·19	433·3	14·58
Punjab	1905-14	11,207	29	·2	·11	·6	·04	141·1	·35	15·6	5·77	16·7	3·33	41·0	·76	39·4	2·44	33·2	1·23	19·3	·62	622·4	21·60
	1914	14,375	34	·3	·14	·3	...	98·9	·21	23·9	7·30	21·2	3·69	38·7	·70	63·3	4·59	21·6	1·32	21·1	·28	618·1	23·95
	1915	15,896	41	...	...	·2	...	164·8	·38	17·8	4·28	34·3	7·55	70·9	1·26	46·7	2·52	43·3	·44	30·5	·31	755·9	25·79
North-West Frontier Province ...	1905-14	1,548	27	·1	·06	·5	·06	444·0	·97	6·1	1·74	18·3	3·55	25·1	1·16	66·2	2·20	34·0	·58	11·6	·39	965·0	17·57
	1914	2,321	23	·4	·43	...	...	380·4	2·15	3·9	2·59	13·4	4·74	16·4	·86	65·1	2·15	30·2	·86	10·8	·86	756·1	17·66
	1915	2,724	23	...	...	...	...	340·7	1·10	7·0	1·10	28·6	6·24	27·5	1·84	46·6	2·57	22·0	·73	9·2	·37	675·1	19·09
Central Provinces	1905-14	3,644	18	·3	·11	·6	·08	123·8	·66	7·2	3·13	6·3	1·45	14·4	·115	51·8	5·38	28·0	·58	9·6	·38	491·4	20·23
	1914	3,726	11	·8	·54	·3	...	29·3	....	5·1	1·88	7·0	1·34	11·5	·54	42·1	2·15	11·0	·81	2·7	·27	277·5	12·61
	1915	4,004	11	1·0	·50	...	...	47·5	...	4·7	2·00	8·5	1·50	13·7	1·25	34·7	2·25	18·2	1·75	4·5	·75	300·4	18·98
Bombay	1905-14	8,416	26	1·1	·44	·8	·01	116·8	·91	4·7	1·91	13·4	3·55	33·9	1·12	42·6	1·53	40·9	1·18	10·5	·62	575·7	17·73
	1914	9,873	26	·1	...	·5	...	154·3	1·01	3·8	1·32	17·3	5·06	39·3	1·42	44·8	1·72	50·1	·81	7·8	·41	652·4	17·02
	1915	10,214	19	·1	·10	·1	...	161·8	·88	3·3	·78	16·2	4·90	34·2	·39	30·5	·98	27·0	·69	3·7	·20	521·3	13·80
Madras	1905-14	10,012	20	5·1	2·26	·3	·03	64·1	·77	9·0	2·75	5·7	1·27	22·4	·49	52·2	3·26	8·3	·15	9·3	·41	417·8	17·54
	1914	9,081	16	1·6	·11	·6	·11	28·6	·88	7·3	2·97	3·1	·44	15·6	1·21	40·6	·99	4·2	...	6·2	·22	304·6	12·44
	1915	9,810	13	·3	·31	·1	...	17·9	·20	6·5	2·55	4·2	1·02	15·0	·71	21·0	·51	5·9	·10	4·9	·31	248·3	11·82
India‡	1905-14	96,775	27	1·3	·66	·6	·06	153·1	·90	9·2	3·34	10·7	2·56	25·5	·82	66·0	3·16	38·1	·80	11·3	·46	590·1	19·16
	1914	102,117	26	·7	·33	·4	·02	117·3	·73	9·8	3·50	10·8	2·45	25·7	·83	60·1	2·62	37·5	·61	11·8	·26	548·3	17·98
	1915	110,930	28	·4	·26	·2	·02	132·1	·80	8·5	3·02	12·9	3·08	30·2	·82	61·3	2·72	40·7	·79	14·0	·31	586·1	18·74
Andamans...	1905-14	12,978	72	·0	·01	...	...	1,058·6	2·97	8·4	5·70	14·6	5·31	57·9	1·09	109·6	5·91	35·6	·51	·1	·02	1,651·6	30·49
	1914	11,996	46	...	...	...	...	840·1	1·75	4·8	2·58	13·3	5·42	53·2	1·58	85·9	3·25	19·7	·33	·3	·08	1,363·7	25·18
	1915	12,239	58	...	...	...	...	1,343·1	3·27	5·5	4·00	23·3	10·62	52·4	3·76	50·2	3·84	43·8	1·14	·4	·16	1,876·3	45·02
India§	1905-14	109,753	32	1·1	·58	·5	·05	260·2	1·14	9·1	3·62	11·2	2·88	29·3	·85	71·2	3·48	37·8	·77	10·0	·41	715·7	20·50
	1914	114,113	28	·6	·30	·3	·02	193·3	·84	9·3	3·40	11·1	2·76	28·6	·91	62·8	2·69	35·6	·58	10·6	·25	634·0	18·74
	1915	123,169	31	·4	·24	·2	·02	252·4	1·05	8·2	3·12	13·9	3·88	32·4	1·11	60·2	2·83	41·0	·63	12·7	·29	714·3	21·35

*Excluding subsidiary Jails.
†The decennial ratios are worked on the total strength of the ten year period.
‡Including Delhi, Sibi, Quetta, Ajmer, Secunderabad, Mercara and excluding Andamans.
§Including Andamans.

TABLE No. IX.—PART II.—*Summary, Sickness and mortality—1915.*

RATIO PER MILLE OF STRENGTH.*

A.—ADMISSIONS } FROM
D.—DEATHS }

Groups.	Years.	Average Strength.†	Constantly sick.	Influenza.		Cholera.		Small-pox.		Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhœa.		All causes.	
				A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Group I.—Burma Coast and Bay Islands	1905-14	10,309	15	1·8	·02	·4	·20	·3	·06	1·5	·30	37·2	·25	26·0	·02	2·8	·81	15·8	1·41	18·8	·16	294·2	14·85
	1914	11,498	16	·6	...	·1	·09	·1	...	2·3	·61	20·9	·17	29·1	...	3·3	·96	17·7	1·30	8·5	...	288·5	18·18
	1915	12,124	17	3·1	...	·2	·16	...	...	2·9	·66	27·0	...	37·9	...	2·2	·66	24·0	1·90	9·0	·08	286·5	20·13
,, II.—Burma, Inland ...	1905-14	4,499	15	·7	...	2·0	1·49	·2	·04	1·1	·24	36·3	·60	13·5	·02	5·0	1·44	26·5	1·96	12·1	·56	274·3	16·25
	1914	5,154	13	2·9	...	...	...	...	...	1·4	·19	27·6	·58	13·2	...	9·1	3·30	12·2	1·58	4·1	·19	228·6	16·49
	1915	5,350	13	5·2	...	2·1	2·24	...	...	2·2	·37	39·1	·93	12·3	...	4·7	2·48	24·9	1·12	3·0	·19	302·2	20·00
,, III.—Assam ...	1905-14	1,539	38	10·9	...	2·0	1·43	·3	·06	·8	·26	293·4	3·57	36·3	·19	11·6	3·90	209·6	11·96	94·4	1·23	981·8	39·71
	1914	1,676	47	2·4	...	3·6	1·19	·6	...	·6	...	203·5	3·58	149·8	1·79	9·5	4·77	337·7	17·90	161·7	...	1,193·9	45·35
	1915	1,808	53	24·9	·55	·6	...	...	...	·6	...	64·2	1·11	133·3	1·11	8·3	1·66	133·8	4·98	123·9	·55	947·5	22·12
,, IV.—Bengal and Orissa ...	1905-14	12,516	43	6·3	·10	1·5	·81	·5	·06	1·3	·34	295·6	1·62	4·6	·03	10·1	2·72	183·6	5·53	96·3	·80	961·8	24·08
	1914	12,535	48	...	...	·4	·24	·1	...	1·8	·24	310·2	1·36	3·5	·08	9·2	2·15	159·0	4·39	110·6	·64	1,050·8	22·66
	1915	14,412	54	2·1	...	·6	·14	1·0	·14	·8	·14	318·7	1·60	3·5	·07	9·2	2·08	209·2	6·59	184·3	1·60	1,223·5	22·41
,, V.—Gangetic Plain and Chutia Nagpur.	1905-14	22,381	27	2·4	·04	·9	·53	·8	·07	·5	·14	160·6	1·04	7·7	·04	9·4	2·13	64·9	3·30	39·7	1·05	578·6	18·07
	1914	21,416	23	·1	...	·2	·14	·6	·05	·3	·19	77·0	·56	8·4	·05	7·3	1·12	41·7	2·07	29·7	·61	449·1	12·42
	1915	23,347	25	5·5	...	·5	·21	·3	...	1·0	...	98·1	1·07	16·1	·09	7·9	2·27	53·8	3·26	33·6	1·24	510·7	17·05
,, VI.—Upper Sub-Himalaya ...	1905-14	12,867	29	6·2	·03	·3	·19	·7	·10	·6	·16	220·3	·64	14·5	·03	20·1	4·49	36·5	2·15	33·2	1·23	671·3	19·27
	1914	15,132	30	5·7	...	1·8	1·06	·3	...	1·0	·33	126·9	·53	17·4	...	20·2	4·10	38·3	1·26	27·2	·99	610·8	18·57
	1915	16,357	32	9·2	...	·1	·06	·2	...	·5	·18	138·5	·61	5·3	...	24·0	4·95	29·8	1·83	28·8	·55	598·8	18·52
,, VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	1905-14	8,947	27	4·7	·16	·1	·06	·8	·06	·6	·16	176·9	·86	6·2	·03	20·5	4·82	47·5	2·65	28·2	·80	615·0	22·87
	1914	11,093	28	4·8	·27	·5	·27	·3	...	1·0	·54	152·7	1·17	22·4	...	23·7	6·13	69·4	5·23	22·1	1·17	609·4	29·57
	1915	12,198	32	·5	...	...	...	·1	...	1·0	·16	222·4	1·07	18·0	·08	35·8	9·02	46·5	2·38	36·8	·25	723·0	25·99
,, VIII.—South Western Rajputana, Central India and Gujarat.	1905-14	4,278	28	1·9	·02	·5	·26	·7	...	·2	·09	154·1	·61	·8	·02	15·5	3·16	21·0	1·26	30·5	·79	544·6	14·84
	1914	4,279	23	...	...	1·4	·70	·9	...	·2	·23	267·4	·70	·2	...	7·0	·70	30·4	·93	64·3	·47	674·7	10·28
	1915	4,705	25	1·1	...	·2	·21	...	...	·2	...	181·1	...	·4	...	13·8	2·13	28·1	1·28	36·3	1·06	595·3	12·54
,, IX.—Deccan ...	1905-14	7,371	25	3·7	·03	·7	·31	·4	·04	·6	·14	125·5	·57	16·3	·07	5·9	1·33	51·7	3·26	41·2	·73	604·4	16·22
	1914	8,303	19	1·7	...	·4	·24	·5	...	·5	·12	45·2	...	44·8	·12	9·8	2·29	40·2	1·69	30·7	·72	443·1	12·05
	1915	8,810	14	4·5	...	·5	·23	...	...	·4	·11	81·3	·23	11·0	·23	9·5	1·70	32·2	1·59	21·3	1·14	396·6	14·07
,, X.—Western Coast ...	1905-14	2,288	22	·0	...	1·7	·70	·7	·09	4·7	·83	89·6	1·27	11·7	·09	8·6	2·49	67·3	2·75	35·1	1·79	489·5	22·11
	1914	1,950	25	...	...	...	...	·5	...	1·0	...	103·1	1·03	4·6	...	6·7	2·56	127·7	3·59	30·8	1·54	516·4	22·05
	1915	1,980	16	9·1	...	·5	·51	...	...	2·0	·51	85·9	·51	1·0	...	5·6	2·02	57·1	·51	23·2	·51	369·7	14·65
,, XI.—Southern India ...	1905-14	9,133	20	·5	·01	5·1	2·15	·3	·02	1·3	·22	63·7	·59	24·3	...	5·6	1·29	49·9	3·13	7·2	·16	412·4	16·74
	1914	8,415	16	...	...	1·1	·12	·6	·12	1·7	·24	29·8	·83	15·2	...	3·1	·36	32·7	·95	4·5	...	302·7	11·65
	1915	9,071	13	3·5	...	·3	·33	·1	...	·2	...	19·1	·22	18·7	...	4·3	1·10	22·0	·55	6·4	·11	255·8	11·24
,, XII.—Hills	1905-14	584	27	1·4	...	6·8	5·13	·7	...	1·9	·51	236·2	3·08	5·3	...	21·7	5·48	97·7	8·39	64·5	1·71	895·3	36·97
	1914	616	26	13·0	...	...	...	...	...	...	...	214·3	3·25	...	...	21·1	4·87	131·5	9·74	42·2	1·62	939·9	34·09
	1915	665	36	...	...	...	...	...	...	6·0	...	341·4	9·02	36·1	...	30·1	6·02	126·3	12·03	99·2	4·51	1,042·1	45·11
India‡	1905-14	96,775	27	3·5	·05	1·3	·66	·6	·06	·9	·22	153·1	·90	12·7	·03	10·7	2·56	66·0	3·16	38·1	·80	590·1	19·16
	1914	102,117	26	1·9	·03	·7	·33	·4	·02	1·1	·29	117·3	·73	18·6	·06	10·8	2·45	60·1	2·62	37·5	·61	548·3	17·08
	1915	110,930	28	4·7	·01	·4	·26	·2	·02	1·1	·17	132·1	·80	16·2	·07	12·9	3·08	61·3	2·72	40·7	·79	586·1	18.74
Andamans	1905-14	12,978	72	4·6	....	·0	·01	...	...	·2	·07	1,058·6	2·97	11·1	·07	14·6	5·31	109·6	5·91	35·6	·51	1,651·6	30·49
	1914	11,996	46	...	...	...	...	...	...	·9	·33	840·1	1·75	4·8	·17	13·3	5·42	85·9	3·25	19·7	·33	1,363·7	25·18
	1915	12,289	58	...	...	...	...	...	...	1·1	·65	1,343·1	3·27	22·1	·49	23·3	10·62	50·2	3·84	43·8	1·14	1,876·3	45·02
India§	1905-14	109,753	32	3·6	·04	1·1	·58	·5	·05	·8	·20	260·2	1·14	12·5	·04	11·2	2·88	71·2	3·48	37·8	·77	715·7	20·50
	1914	114,113	28	1·7	·03	·6	·30	·3	·02	1·1	·30	193·3	·84	17·2	·07	12·1	2·76	62·8	2·69	35·6	·58	634·0	18·74
	1915	123,169	31	4·2	·01	·4	·24	·2	·02	1·1	·22	252·4	1·05	16·8	·11	13·9	3·83	60·2	2·83	41·0	·83	714·3	21·35

*Excluding subsidiary jails.
†The decennial ratios are worked on the total strength of the ten year period.
‡Including Aden and excluding Andamans.
§Including Andamans.

TABLE NO. X.—*Ratios of Administrations, 1915.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	Burma.	Assam.	Bengal.	Bihar and Orissa.	United Provinces.	Punjab.	N.-W.F Province.	Central Provinces.	Bombay.	Madras.	India.*	Andamans.	India.
I.—AVERAGE ANNUAL STRENGTH...	17,474	1,901	13,435	7,146	27,020	15,896	2,724	4,004	10,214	9,810	100,930	12,239	123,169
II.—CONSTANTLY SICK RATE OF THE YEAR	15·7	52·1	55 8	31·5	21·0	41·3	22·8	11·2	19·2	12·9	27·5	58·3	30·6
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	49·0	53·1	30·1	...	39·7	22·5	11·4	18·2	13·1	26·7	...	29·7
III.—ADMISSION RATE OF THE YEAR—													
Influenza	3·7	23·7	2·2	·1	6·0	·3	...	9·0	2·3	3·3	4·7	...	4·2
Cholera...	·7	·5	·3	2·2	·1	...	...	1·0	·1	·3	·4	...	·4
Small-pox	...	...	·5	1·3	·2	·2	...	...	·1	·1	·2	...	·2
Enteric Fever	2·7	·5	·8	3·1	·3	·8	1·5	·5	·1	·6	1·1	1·1	1·1
Malaria	30·7	69·4	332·0	123·3	93·3	164·8	340·7	47·5	161·3	17·9	132·1	1,343·1	252·4
Sandfly Fever	...	...	...	...	...	...	...	3·5	...	...	·1	...	·1
Pyrexia of uncertain origin ...	30·1	138·3	·4	48·6	2·8	17·4	·7	17·7	2·8	17·4	16·2	22·1	16·3
Tubercle of the lungs ...	7·8	3·7	10·0	9·0	6·8	17·8	7·0	4·7	3·3	6·5	8·5	5·5	8·2
Pneumonia	3·0	7·9	9·5	6·4	11·3	34·3	28·6	8·5	16·2	4·2	12·9	23·3	13·9
Respiratory Diseases ...	21·4	29·5	35·1	28·4	23·2	70·9	27·5	13·7	34·2	15·0	30·2	52·4	32·4
Dysentery	24·3	137·8	215·5	123·8	28·0	46·7	46·6	34·7	30·5	21·0	61·3	50·2	60·2
Diarrhœa	7·2	132·0	138·3	82·4	17·0	43·3	22·0	18·2	27·0	5·9	40·7	43·8	41·0
Spleen Diseases	...	...	...	...	·1	1·9	·4	...	...	...	·3	·6	·3
Scurvey...	·6	...	·9	·3	1·4	·7	1·1	...	2·9	...	1·0	19·9	2·9
Anæmia and Debility ...	5·0	6·8	23·0	26·7	7·2	38·5	9·2	4·5	3·7	4·9	14·0	·4	12·7
Abscess, Ulcer and Bail ...	30·9	48·9	72·6	57·1	76·4	82·8	49·2	36·7	42·7	19·2	58·2	71·8	59·6
ALL CAUSES ...	291·3	965·3	1,248·9	742·4	433·3	755·9	675·1	300·4	521·3	248·3	586·1	1,876·3	714·3
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	960·3	1,223·1	731·0	...	740·8	687·3	309·2	544·7	352·8	594·3	...	715·1
IV.—DEATH RATE OF THE YEAR—													
Cholera	·80	...	·07	·84	·07	...	...	·50	·10	·31	·26	...	·24
Small-pox	...	...	·15	...	...	...	...	...	...	...	·02	...	·02
Enteric...	·57	...	·15	...	·04	·19	·37	...	·10	·10	·17	·65	·22
Malaria	·29	1·58	1·71	·84	1·04	·38	1·10	...	·88	·20	·80	3·27	1·05
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	...	1·05	·07	...	·07	·06	...	·25	·10	...	·07	·49	·11
Tubercle of the lungs ...	4·86	2·10	2·83	3·78	2·41	4·28	1·10	2·00	·78	2·55	3·02	4·00	3·12
Pneumonia	1·20	1·58	2·08	3·50	2·07	7·55	6·24	1·50	4·90	1·02	3·08	10·62	3·83
Respiratory Diseases ...	·97	·53	·97	·84	·41	1·26	1·84	1·25	·39	·71	·82	3·76	1·11
Dysentery	1·66	4·73	6·10	7·00	2·15	2·52	2·57	2·25	·98	·51	2 72	3·84	2·83
Diarrhœa	·11	·53	1·71	1·68	·96	·44	·73	1·75	·69	·10	·79	1·14	·83
Hepatic Abscess	·11	...	·07	...	·07	...	...	...	...	...	·05	·33	·07
Anæmia and Debility ...	·11	...	·37	·98	·19	·31	·37	·75	·20	·31	·31	·16	·03
Phagedæna, Slough, and Gangrene	...	...	...	...	·11	·06	...	·25	10	...	·05	·41	·09
ALL CAUSES ...	20·09	21·57	21·21	25·75	14·58	25·79	19·09	18·98	13·80	11·82	18·74	45·02	21·35
INCLUDING SUBSIDIARY JAILS AND LOCK-UPS	...	21·49	20·66	25·04	...	25·41	18·56	18·85	14·02	11·00	18·40	...	20·91

* Including Delhi, Sibi, Quetta, Ajmer, Secunderabad, Mercara and excluding Andamans.
† Including Delhi, Sibi, Quetta, Ajmer, Secunderabad, Mercara and Andamans.

TABLE No. XI.—*Ratios of Geographical Groups, 1915.*

	RATIOS PER 1,000 OF THE AVERAGE STRENGTH.												
	I Burma Coast and Bay Islands.	II Burma Inland.	III Assam.	IV Bengal and Orissa.	V Gangetic Plain and Chutia Nagpur.	VI Upper Sub-Himalaya.	VII N.-W. Frontier, Indus Valley, and N.-W. Rajputana.	VIII S.-E. Rajputana, Central India and Gujarat.	IX Deccan.	X Western coast.	XI Southern India.	XII Hills.	India.*
I.—AVERAGE ANNUAL STRENGTH...	12,124	5,350	1,808	24,412	23,347	16,357	12,198	4,705	8,810	1,980	9,071	665	110,930
II.—CONSTANTLY SICK RATE OF THE YEAR	16·9	13·1	53·1	54·2	24·5	31·7	31·9	25·1	14·3	16·2	13·1	36·1	27·5
III.—ADMISSION RATE OF THE YEAR—													
Influenza	3·1	5·2	24·9	2·1	5·5	9·2	·5	1·1	4·5	9·1	3·5	...	4·7
Cholera...	·2	2·1	·6	·6	·5	·1	...	·2	·5	·5	·3	...	·4
Small-pox	...	...	...	1·0	·3	·2	·1	...	...	...	·1	...	·2
Enteric Fever	2·9	2·2	·6	·8	1·0	·5	1·0	·2	·4	2·0	·2	6·0	1·1
Malaria	27·0	39·1	64·2	318·7	98·1	138·5	222·4	181·1	81·3	85·9	19·1	341·4	132·1
Sandfly Fever	...	...	...	...	...	...	...	...	1·6	...	...	...	·1
Pyrexia of uncertain origin ...	37·9	12·3	133·3	3·5	16·1	5·3	18·0	·4	11·1	1·0	18·7	36·1	16·2
Tubercle of the lungs ...	10·1	2·4	3·3	10·7	7·2	9·6	15·0	7·0	4·1	5·6	6·3	7·5	8·5
Pneumonia	2·2	4·7	8·3	9·2	7·9	24·0	35·8	13·8	9·5	5·6	4·3	30·1	12·9
Respiratory Diseases ...	10·8	12·9	30·4	35·4	22·0	46·6	65·1	34·6	18·2	13·1	15·5	37·6	30·2
Dysentery	24·0	24·9	133·8	209·2	53·8	29·8	46·5	28·1	32·2	57·1	22·0	126·3	61·3
Diarrhœa	9·0	3·0	123·9	134·3	33·6	28·8	36·8	36·3	21·3	23·2	6·4	99·2	40·7
Spleen Diseases	...	...	...	...	·1	1·7	·3	·2	...	...	...	...	·3
Scurvy	·9	...	...	·8	1·6	·6	3·0	...	·2	...	...	...	1·0
Anæmia and Debility ...	5·9	3·0	7·2	25·9	9·1	23·1	26·7	14·9	3·7	·5	5·3	19·3	14·0
Abscess, Ulcer and Boil ...	27·9	37·8	48·1	73·3	73·6	77·9	63·8	78·6	43·4	13·1	20·4	60·2	58·2
ALL CAUSES ...	286·5	302·2	947·5	1,223·5	510·7	598·8	723·0	595·3	396·6	369·7	255·8	1,042·1	586·1
IV.—DEATH RATE OF THE YEAR—													
Cholera...	·16	2·24	...	·14	·21	·06	...	·21	·23	·51	·33	...	·26
Small-pox	...	...	...	·14	...	...	...	...	...	...	...	...	·02
Enteric Fever	·66	·37	...	·14	...	·18	·16	...	·11	·51	...	...	·17
Malaria	...	·93	1·11	1·60	1·07	·61	1·07	...	·23	·51	·22	9·02	·80
Sandfly Fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin ...	...	...	1·11	·07	·09	...	·08	...	·23	...	...	...	·07
Tubercle of the lungs ...	6·35	1·50	2·21	3·3	2·40	3·85	2·13	2·13	1·59	2·53	2·43	3·01	3·02
Pneumonia	·66	2·43	1·66	2·28	2·27	4·95	9·02	2·13	1·70	2·02	1·10	6·02	3·08
Respiratory Diseases ...	1·24	·37	·55	·97	·47	·98	·98	1·06	·68	...	·77	3·01	·82
Dysentery	1·90	1·12	4·98	6·59	3·26	1·83	2·38	1·28	1·59	·51	·55	12·03	2·72
Diarrhœa	·08	·19	·55	1·60	1·24	·55	·25	1·06	1·14	·51	·11	4·51	·79
Hepatic Abscess ...	·16	...	...	·07	·04	...	...	·21	...	...	...	...	·05
Anæmia and Debility ...	·16	...	...	·56	·34	·06	·49	·21	·45	·51	·33	...	·31
Phagedæna, Slough and Gangrene.	...	...	...	...	·04	...	·08	·43	·23	...	...	...	·05
ALL CAUSES ...	20·33	20·00	22·12	22·41	17·05	18·52	25·99	12·54	14·07	14·65	11·24	45·11	18·74

*Including Aden.

TABLE NO. XII.—*Provincial Birth and Deaths Statistics, 1915.*

Province.	Year.	Births.			Number of deaths.			Ratio of deaths per 1,000 of population.			Highest death rate.		Lowest death rate.		Mean death rate during previous five years.			Number of deaths of males to very 100 deaths of females.
		Total number.	Ratio per 1,000 of population.	Mean ratio per 1,000 of population during previous five years.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	Total.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	In municipalities and towns.	In districts excluding towns.	Total.	
Delhi	1914	19,387	48·86	...	9,501	5,578	15,079	42·14	32·52	37·98	...	...	...	...	...	...	...	103
	1915	19,969	47·91	...	7,703	4,368	12,071	34·16	22·85	28·97	...	...	...	...	...	...	...	106
Bengal	1914	1,535,281	33·86	35·02	71,875	1,359,414	1,431,289	24·72	32·04	31·57	43·32	52·48	5·03	21·71	24·12	29·10	28·78	107
	1915	1,441,628	31·80	34·53	71,836	1,416,731	1,488,567	24·70	33·39	32·83	38·75	46·41	8·50	22·97	24·06	29·69	29·33	108
Bihar and Orissa	1914	1,461,879	42·3	40·9	34,511	942,332	976,843	28·8	28·3	28·3	66·1	36·5	6·5	21·5	29·1	32·3	32·2	105
	1915	1,396,805	40·4	41·9	36,074	1,075,851	1,111,925	30·9	32·2	32·2	57·8	44·5	13·4	21·0	30·2	31·6	31·5	106
Assam	1914	199,343	32·94	32·01	2,726	146,518	149,244	22·19	24·71	24·66	42·53	33·61	4·25	19·54	20·66	27·21	26·99	112
	1915	203,336	33·60	32·39	3,586	183,192	186,778	30·02	30·88	30·86	91·74	41·95	8·89	24·88	21·46	26·28	26·18	106
United Provinces of Agra and Oudh.	1914	2,104,554	44·93	42·24	126,060	1,441,206	1,567,266	40·77	32·91	33·46	68·33	54·20	13·62	23·22	41·58	36·81	37·14	108·66
	1915	2,036,121	43·48	44·56	127,535	1,279,208	1,406,743	41·24	29·22	30·04	76·06	52·92	5·71	18·88	42·19	35·93	36·37	108·67
Punjab	1914	895,006	46·3	42·8	63,269	554,804	618,073	36·94	31·48	31·96	78·68	46·63	·92	20·69	33·44	30·79	31·12	106·2
	1915	843,012	43·6	44·9	63,174	639,376	702,550	36·17	36·35	36·33	68·96	59·48	2·40	18·73	34·97	30·88	31·25	105·0
North-West Frontier Province	1914	66,701	32·7	35·3	5,539	47,021	52,560	28·96	25·42	25·75	37·02	34·52	11·00	20·78	24·05	24·28	24·25	112·6
	1915	64,764	31·7	35·3	5,395	42,799	48,194	28·21	23·14	23·61	67·37	29·23	15·33	18·02	25·15	24·37	24·44	114·3
Central Provinces and Berar ...	1914	714,917	51·37	50·80	48,758	461,894	510,652	39·26	36·44	36·69	66·59	45·61	13·90	28·23	41·26	36·64	37·05	111·02
	1915	667,340	47·95	50·75	56,603	443,079	499,682	44·29	35·06	35·91	80·57	42·13	13·95	25·74	41·25	37·46	37·77	107·77
Madras Presidency ...	1914	1,340,168	33·5	32·0	146,797	851,470	998,267	30·4	24·2	25·0	114·5	35·1	4·3	16·4	27·7	22·5	23·1	102·7
	1915	1,249,434	31·2	32·1	126,869	753,081	879,950	26·2	21·4	22·0	60·3	25·9	4·4	15·0	28·5	31·1	23·7	102·5
Coorg	1914	4,590	26·23	26·88	540	5,418	5,958	54·10	32·84	34·05	77·59	37·05	40·20	24·52	54·14	31·22	32·52	112·94
	1915	4,433	25·33	26·44	445	4,993	5,438	44·58	30·26	31·08	63·04	38·51	33·66	21·06	54·22	34·35	35·49	116·57
Bombay Presidency ...	1914	733,076	37·43	35·77	107,413	470,091	577,504	33·78	28·65	29·48	72·12	40·42	9·04	11·02	36·36	28·20	29·51	107·35
	1915	726,780	37·10	36·14	96,261	415,352	511,613	30·28	25·31	26·12	85·27	38·02	5·56	12·95	32·78	28·97	29·93	106·34
Lower Burma	1914	221,460	34·69	33·00	26,919	119,840	146,759	33·55	21·47	22·99	49·89	26·38	17·31	15·98	36·81	23·95	25·56	121
	1915	204,822	33·39	32·69	25,392	128,695	154,087	32·62	24·03	25·12	64·36	30·82	16·46	17·21	35·65	22·79	24·42	119
Upper Burma	1914	127,423	36·69	35·13	12,207	78,862	91,069	41·26	24·82	26·22	51·20	36·98	16·77	19·37	43·99	28·07	29·57	98
	1915	141,428	38·01	35·36	16,092	105,670	121,762	50·23	31·07	32·72	60·51	48·94	22·63	24·87	41·84	26·74	28·11	100
Ajmer-Merwara	1914	23,515	46·90	42 42	Not available		15,208	Not available		30·33	Not available						40·48	108·04
	1915	21,953	43·78	44·61	Not available		13,052	Not available		26·03	Not available						36·86	110·45

TABLE No. XIII.—*Births.—1915.*

Province.	Population under registration.	Ratio of Births per 1,000 of population.			Number of males born to every 100 females.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.
		Maximum for any one district.	Minimum for any one district.	Mean for the province.			
Delhi	416,656	...	...	47·91	105	18·95	...
Bengal	45,329,247	43·06	18·50	31·80	107	...	1·03
Bihar and Orissa	34,490,038	48·1	31·7	40·4	105	8·2	...
Assam	6,051,507	39·71	30·17	33·60	106	2·74	...
United Provinces of Agra and Oudh	46,80,556	49·25	25·44	43·48	108·76	13·44	...
Punjab	19,337,146	51·3	21·3	43·6	109·7	7·3	...
North-West Frontier Province	2,041,077	38·3	26·6	31·7	125·5	8·1	...
Central Provinces and Berar	13,916,308	53·19	42·97	47·95	104·59	12·04	...
Madras Presidency	40,005,735	37·60	21·9	31·2	104·5	9·2	...
Coorg	174,976	36·74	18·07	25·33	101·59	...	5·74
Bombay Presidency	19,587,383	50·78	17·54	37·10	107·74	10·98	...
Burma ... Lower	6,134,572	44·70	19·74	33·39	107	8	...
Burma ... Upper	3,721,281	43·95	32·73	38·01	100	5	...
Ajmer-Merwara	501,395	48·80	42·19	43·78	113·53	17·75	...

TABLE No. XIV.—*Deaths.—1915.*

Province.	Population under registration.	Area in square miles.	Average population per square mile.	Ratio of Deaths per 1,000 of population.			Death rate by Sex.	
				Maximum for any one district.	Minimum for any one district.	Mean for the province.	Male.	Female.
Delhi	416,656	6·82*	33*	...	...	28·97	26·86	31·62
Bengal	45,329,247	70,873	639	45·21	22·77	32·83	33·34	32·30
Bihar and Orissa	34,490,038	83,181	414	44·2	21·0	32·2	34·0	30·5
Assam	6,051,507	31,845	190	40·91	25·41	30·86	31·26	30·44
United Provinces of Agra and Oudh ...	46,820,556	106,357	440	52·97	19·05	30·04	29·95	30·15
Punjab	19,337,146	96,654	200	57·4	19·0	36·3	39·9	39·3
North-West Frontier Province ...	2,041,077	13,399	152	29·8	19·2	23·6	23·8	23·4
Central Provinces and Berar ...	13,916,308	99,823	139	44·51	25·97	35·91	37·40	34·43
Madras Presidency	40,005,735	126,585	316	36·4	15·5	22·0	22.6	21·4
Coorg	174,976	1,582	111	38·51	4·84	31·08	30·09	32·32
Bombay Presidency	19,587,383	1,978	159	39·16	13·66	26·12	25·88	26·38
Burma ... Lower	634,572	71,116	86	33·54	18·27	25·12	25·77	24·39
Burma ... Upper	3,721,281	40,542	92	51·41	26·18	32·72	34·00	31·53
Ajmer-Merwara	501,395	2,711	185	26·66	25·83	26·03	25·73	26·37

* Delhi city only.

TABLE No. XV.—*Deaths in Towns and Rural Circles compared—1915.*

Province.	Number of registration circles.			Population.			Ratio of deaths per 1,000 of population.		
	Rural.	Town.	Total.	Rural.	Town.	Total.	Rural.	Town.	Total.
Delhi	11	1	12	191,185	225,471	416,656	22·85	34·16	28·97
Bengal	375	112	487	42,421,996	2,907,251	45,329,247	33·39	24·70	32·83
Bihar and Orissa ...	230	55	285	33,322,784	1,167,254	34,490,038	32·2	30·9	32·2
Assam	79	20	99	5,932,062	119,445	6,051,507	30·88	30·02	30·86
United Provinces of Agra and Oudh.	1,066	93	1,159	43,770,699	3,049,857	46,820,556	29·22	41·24	30·04
Punjab	413	139	552	17,590,392	1,746,754	19,337,146	36·35	36·17	36·33
North-West Frontier Province.	66	13	79	1,849,832	191,245	2,041,077	23·14	28·21	23·61
Central Provinces and Berar.	397	110	507	12,638,587	1,277,721	13,916,308	35·06	44·29	35·91
Madras Presidency ...	231	269	500	35,166,665	4,839,070	40,005,735	21·4	26·2	22·0
Coorg	8	2	10	164,995	9,981	174,976	30·26	44·58	31·08
Bombay Presidency ...	249	112	361	16,407,762	3,179,621	19,587,383	25·31	30·28	26·12
Burma { Lower ...	217	39	256	5,356,176	778,396	6,134,572	24·03	32·62	25·12
Burma { Upper ...	138	20	158	3,400,963	320,318	3,721,281	31·07	50·23	32·72
Ajmer-Merwara ...	Not available.		23	Not available.		501,395	Not available.		26·03

TABLE No. XVI.—*Deaths according to age—1915.*

Province.	Ratio per 1,000 of population.																	
	Under one* year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.		20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years and upwards.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Delhi ...	228·99	212·36						Information		not available.										
Bengal ...	224·43	213·13	45·18	40·35	18·66	15·33	12·72	12·01	17·25	19·85	18·81	22·03	23·06	24·49	30·04	28·02	46·77	43·28	86·26	73·68
Bihar and Orissa.	190·76	180·86	56·8	52·0	16·0	13·6	12·7	11·3	14·3	13·0	17·4	14·9	20·6	17·6	27·3	20·6	43·0	37·1	91·1	73·9
Assam ...	210·78	192·41	37·40	33·92	16·17	13·50	13·18	11·34	15·15	19·84	17·94	24·00	22·07	25·95	29·38	27·03	44·86	38·64	81·78	64·53
United Provinces of Agra and Oudh.	209·85	200·03	60·19	58·74	10·57	10·28	8·14	9·23	9·06	12·39	12·54	14·39	15·08	15·17	21·61	19·11	36·43	32·27	73·11	63·45
Punjab ...	188·02	189·17	48·48	50·79	16·28	21·06	16·16	25·31	17·56	23·69	16·06	19·49	20·41	24·98	26·44	28·98	36·43	40·84	78·03	84·47
North-West Frontier Province.	169·21	162·54	37·3	32·2	9·4	9·8	8·6	11·9	12·3	14·4	10·8	11·3	13·6	14·5	20·1	20·0	39·0	30·2	60·3	65·10
Central Provinces and Berar.	274·28	244·49	67·39	59·88	13·55	12·58	8·76	9·40	10·41	12·06	11·42	12·41	13·98	13·58	20·69	16·04	34·50	29·85	87·87	76·88
Madras Presidency.	194·40	178·40	29·4	28·3	8·2	7·9	5·7	5·8	8·1	10·8	9·4	10·5	11·8	10·9	16·1	12·8	26·6	22·2	70·0	67·8
Coorg ...	294·09	284·22	39·22	32·51	11·36	8·93	9·09	8·87	12·84	13·22	16·98	25·96	25·77	29·40	35·32	30·92	47·23	44·33	82·20	76·14
Bombay Presidency.	178·92	164·55	42·00	40·44	10·11	11·34	7·52	9·96	9·60	12·93	11·24	13·66	14·14	14·78	20·64	16·42	35·03	29·07	83·01	79·97
Burma { Lower	222·77	255·03	...	65·63	11·07	10·43	8·43	7·69	12·31	11·46	14·76	...	...	16·05	26·16	...	...	22·93	66·52	68·05
Burma { Upper	186·78	223·71	...	91·64	15·68	14·83	9·42	9·14	13·42	12·45	16·65	...	...	17·53	27·47	...	...	22·31	82·87	76·91
Ajmer-Merwara								Information		not available.										
Total ...	208·06	195·29	49·14	44·02	13·62	12·71	10·13	10·77	12·45	14·97	13·72	16·41	18·30	16·58	22·94	21·03	38·47	31·10	79·21	71·88

* Calculated on the number of births during 1915.

TABLE NO. XVII.—*Deaths according to cause—1915.*

Province.	Deaths per 1,000 of population in 1915.								All causes.	Ratio of deaths in 1914.	Ratio of deaths in 1913.
	Cholera.	Small-pox.	Plague.	Fevers.	Dysentery and Diarrhœa.	Respiratory diseases.	Injuries.	All other causes.			
Delhi	·22	·03	·05	16·11	·63	8·74	·24	2·94	28·97	37·98	39·99
Bengal...	2·88	·72	·004	23·47	·63	·25	·43	4·42	32·83	31·57	29·38
Bihar and Orissa	2·5	·4	·7	20·2	·9	·2	·5	6·5	32·2	28·3	29·14
Assam	4·46	·67	...	15·16	2·66	·78	·36	6·76	30·86	24·66	27·66
United Provinces of Agra and Oudh ...	1·93	·05	1·24	20·44	·41	·52	·60	4·84	30·04	33·46	34·84
Punjab	·68	·09	11·48	14·73	·65	2·44	·36	5·91	36·33	31·96	30·19
North-West Frontier Province ...	·45	·01	·17	17·89	·24	·78	·38	3·69	23·61	25·75	24·65
Central Provinces and Berar	·41	·08	1·46	17·09	3·31	3·17	·58	9·81	35·91	36·69	30·28
Madras Presidency	·8	·6	·1	7·3	1·5	1·0	·2	10·5	22·0	25·0	21·4
Coorg	...	·13	·01	26·00	·68	·25	·09	4·00	31·08	34·05	33·48
Bombay Presidency	·02	·07	2·24	11·48	1·62	3·23	·41	7·05	26·12	29·48	26·63
Burma (Lower	1·34	·03	·47	8·24	1·33	·88	·38	12·44	25·12	22·99	23·58
Burma (Upper...	2·52	·00	·47	9·05	·92	·84	·46	18·45	32·72	26·22	27·60
Ajmer-Merwara	·01	·01	...	21·11	·92	·80	·51	2·68	26·03	30·33	25·85

TABLE No. XVIII.—*Total number of deaths by months—1915.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	RATIO PER 1,000 OF POPULATION. 1915.	1914.
Delhi ...	854	599	783	993	1,336	1,032	871	1,011	826	1,022	1,344	1,400	12,071	28·97	37·98
Bengal ...	138,689	113,908	146,143	124,670	106,717	92,452	83,656	98,376	102,128	116,297	179,542	186,589	1,488,567	32·83	31·57
Bihar & Orissa	71,364	68,477	93,119	87,584	84,330	78,161	77,540	105,753	101,091	107,760	124,826	111,920	1,111,925	32·2	28·3
Assam ...	12,788	10,207	10,735	11,519	12,762	14,318	14,077	15,357	17,834	21,474	24,453	21,254	186,778	30·86	24·66
United Provinces of Agra and Oudh.	98,833	85,547	103,453	116,435	116,778	107,837	92,193	106,994	120,284	153,471	151,413	153,505	1,406,743	30·04	33·46
Punjab ...	57,644	61,798	87,656	116,728	93,067	46,871	39,852	36,152	33,739	35,652	41,009	52,362	702,550	36·33	31·96
North-West Frontier Province.	4,441	3,230	3,260	2,734	4,278	3,769	3,296	3,462	4,239	4,679	4,908	5,898	48,194	23·61	25·75
Central Provinces and Berar.	33,403	31,324	31,873	30,649	35,083	39,118	29,943	43,244	53,210	59,493	55,978	56,364	499,682	35·91	36·69
Madras Presidency.	92,235	72,966	70,043	64,394	63,999	62,273	71,763	77,230	73,756	68,945	71,399	90,947	879,950	22·0	25·0
Coorg ...	430	312	389	420	513	569	604	512	440	421	371	457	5,438	31·08	34·05
Bombay Presidency.	43,743	38,218	43,424	38,723	35,382	32,469	34,068	42,635	45,504	48,722	50,626	58,099	511,613	26·12	29·48
Burma {Lower	11,827	10,737	9,482	9,697	9,903	13,017	16,374	15,951	15,162	14,122	13,743	14,072	154,087	25·12	22·99
Burma {Upper	8,397	7,149	7,375	6,726	6,210	8,285	10,988	12,367	14,048	12,950	12,860	14,407	121,762	32·72	26·22
Ajmer-Merwara.	1,155	942	1,061	1,233	1,137	866	842	921	1,050	918	1,236	1,691	13,052	26·03	30·33
TOTAL ...	575,803	505,414	608,796	612,505	571,495	501,037	475,467	559,965	583,331	645,926	733,708	768,965	7,142,412	29·94	30·00

TABLE No. XIX.—*Ratio of deaths from all causes according to months—1915.*

Province.	ANNUAL* DEATH RATE PER MILLE FOR THE MONTH OF January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Ratio for the year.
Delhi	24·13	18·74	22·13	29·00	37·75	30·14	24·61	28·57	24·12	28·88	39·25	39·56	28·97
Bengal	36·02	32·76	37·96	33·46	27·72	24·81	21·57	25·55	27·41	30·21	48·19	48·47	32·83
Bihar and Orissa	24·36	25·88	31·79	30·90	28·79	27·57	26·47	36·10	35·66	36·79	44·03	38·21	32·2
Assam	24·88	21·99	20·89	23·16	24·83	28·79	27·39	29·88	35·86	41·78	49·16	41·35	30·86
United Provinces of Agra and Oudh ...	24·85	23·82	26·02	30·26	29·37	28·02	23·18	26·91	31·26	38·59	39·35	38·60	30·04
Punjab	35·10	41·66	53·37	73·44	56·67	29·49	24·27	22·01	21·24	21·71	25·80	31·88	36·33
North-West Frontier Province	25·62	20·63	18·81	16·30	24·68	22·47	19·01	19·97	25·27	26·99	29·26	34·02	23·61
Central Provinces and Berar	28·26	29·34	26·97	26·80	29·68	34·20	25·33	36·59	46·52	50·34	48·94	47·69	35·91
Madras Presidency	27·15	23·78	20·61	19·58	18·84	18·94	21·12	22·73	22·43	20·29	21·71	26·77	22·0
Coorg	28·93	23·24	26·18	29·20	34·52	39·56	40·64	34·45	30·59	28·33	25·80	30·75	31·08
Bombay Presidency	26·29	25·43	26·10	24·05	21·27	20·17	20·48	25·63	28·26	29·29	31·45	34·92	26·12
Burma ... {Lower	22·70	22·82	18·20	19·23	19·01	25·82	31·43	30·62	30·07	27·10	27·26	27·01	25·12
Burma ... {Upper	26·57	25·04	23·33	21·99	19·65	27·09	34·77	39·13	45·93	40·97	42·05	45·58	32·72
Ajmer-Merwara	27·12	24·49	24·92	29·92	26·70	21·01	19·77	21·63	25·48	21·56	29·99	39·71	26·03
India ...	28·42	27·62	30·05	31·24	28·21	25·56	23·47	27·64	29·75	31·88	37·42	37·96	29·94

* The ratios in the statement have been calculated with reference to the number of days in each month.

TABLE No. XX.—*Deaths from cholera in the different provinces in India from 1884 to 1915.*

YEAR.	Delhi.	*Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	(a) N.-W. Frontier Province.	Central Provinces. ¶	Berar.	Madras.	Coorg.	Bombay.	Lower Burma.	Upper Burma. †	Ajmer-Merwara.	Rajputana	Central India.	Hyderabad (cantonment stations).	Mysore.
1884	...	134,421	...	22,276	30,143	614	...	149	87	75,476	...	13,804	5,515	...	227	1,297	1,018	2,479	330
1885	...	173,767	...	7,753	63,457	1,936	...	21,868	3,683	58,109	...	37,287	7,685	...	100	1,615	4,624	1,387	2,677
1886	...	118,368	...	20,188	34,565	12	...	16,679	976	12,417	...	167	4,027	...	765	173	290	499	10
1887	...	172,578	...	7,941	200,628	8,804	...	12,576	24,396	28,359	3	25,711	2,649	...	384	2,612	8,868	2,831	832
1888	...	111,391	...	9,693	18,704	14,938	...	921	305	58,677	2	36,500	13,982	...	13	32	191	2,057	1,015
1889	...	171,103	...	18,288	48,494	2,838	...	52,588	10,925	76,020	9	32,431	3,240	...	55	6,923	3,344	1,128	1,590
1890	...	145,885	...	15,396	80,295	3,401	...	4,787	847	35,288	5	3,259	1,076	...	408	2,746	3,132	...	1,326
1891	...	229,575	...	23,882	169,013	10,107	...	21,312	7,958	98,773	7	17,850	2,400	...	532	2,946	13,474	3,102	1,204
1892	...	259,398	...	21,552	194,886	75,959	...	39,972	2,030	79,033	58	42,900	6,208	...	2,352	26,760	8,384	53	5,497
1893	...	126,976	...	21,849	12,154	639	...	557	1,188	32,209	9	18,853	2,393	...	3	314	127	165	680
1894	...	236,150	...	13,497	178,079	113	...	7,043	3,452	24,289	3	33,588	7,428	...	...	2	5,210	1,862	328
1895	...	177,087	...	18,962	51,562	549	...	15,506	11,919	21,172	...	8,890	5,150	...	289	1,049	6,043	467	2,334
1896	...	226,824	...	17,042	69,147	5,146	...	52,985	12,264	47,847	49	35,404	2,959	...	12	3,797	15,766	525	2,100
1897	...	196,247	...	33,240	44,208	622	...	57,131	10,122	143,445	106	57,109	8,538	...	19	496	13,202	1,039	4,248
1898	...	65,020	...	11,149	2,598	338	...	7	...	65,444	8	4,368	2,972	...	1	6	2	6	1,193
1899	...	107,678	...	8,380	8,142	1,816	...	76‖	541	29,082	...	8,579	4,942	2,050	1	498	...	...	123
1900	...	345,878	...	23,761	84,960	28,260	...	63,114	18,375	60,662	...	163,889	3,440	41	4,842	28,719	20,450	3,813	779
1901	...	110,753	...	7,468	53,995	180	117	49	17	81,370	58	13,600	3,852	‡	50	6	72	1	11,351
1902	...	150,971	...	12,658	25,160	371	...	28	16	29,769	...	3,238	1,844	57	32	1,519	12	...	218
1903	...	203,405	...	8,360	47,159	14,688	1,354	437	...	27,393	...	1,825	5,346	2,887	...	236	1,110	...	98
1904	...	137,701	...	5,588	6,617	716	1	2,967	...	23,109	...	13,156	2,472	508	...	1	150	...	471
1905	...	146,339	...	142,312**	121,790	2,197	300	1,217	...	16,888	...	5,396	3,511	1,836	...	3	27	64	626
1906	...	192,596	...	108,278	149,549	4,232	...	38,768	...	142,811	10	46,119	5,529	2,343	284	4,714	10,147	1,061	7,223
1907	...	205,702	...	77,181	22,438	437	266	4,391	...	81,565	187	7,656	7,964	414	1	64	41	1	4 972
1908	...	268,908	...	59,329	83,544	12,297	2,845	9,048	...	141,970	114	1,759	19,336	2,575	...	737	1,730	937	2,449
1909	...	56,711	...	71,737	21,823	1,513	134	7,687	...	39,424	99	28,714	4,041	7,348	...	403	1,421	164	1,629
1910	...	162,611	...	117,969	102,402	2,131	1,605	5,316	...	32,594	56	3,694	1,834	177	2	8	2,864	2	1,812
1911	...	124,560	...	39,248	117,689	1,260	12	2,998	...	58,174	6	5,817	2,595	1,596	50	85	1,054	803	210
1912	406	95,467	77,023	(b) 14,303	18,894	1,833	1,329	34,313	...	92,497	...	64,505	6,013	1,173	13	414	9,080	1,190	6,748
1913	37	78,898	76,379	16,407	60,427	5,811	175	15,286	...	37,750	192	5,134	3,704	635	...	4,085	2,823	1,322 (c)	8,062
1914	12	89,224	32,115	9,270	32,498	6,656	2,300	29,345	...	68,449	...	17,779	2,042	31	9	1,627	10,075	5,893(c)	849
1915	92	13,679	88,349	26,979	90,508	13,196	932	5,662	...	30,098	...	377	8,209	9,288	3	1,981	795	2,072(c)	178

* Excluding Calcutta from 1884 to 1892.
† Statistics from 1884 to 1898 not available.
‡ Statistics not available.
§ Including 30 deaths in cantonments.
‖ Excluding Zamindaris.
¶ Including Berar from 1903.
**Eastern Bengal and Assam.
(a) 1884-1900 included in the Punjab.
(b) Assam only.
(c) For the whole state including cantonment stations.

TABLE No. XXI.—*Deaths from Cholera in British Provinces, by months, during the year 1915.*

Province.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Ratio per 1,000 of population. 1915.	1914.
Delhi ...	...	...	3	50	11	7	7	9	5	...	...	...	92	·22	·03
Bengal ...	7,496	5,447	16,110	19,833	8,983	4,840	4,786	5,108	6,645	12,823	19,681	18,927	130,679	2·88	1·96
Bihar and Orissa	1,450	1,542	2,649	3,853	4,521	5,024	7,287	12,239	9,765	15,205	17,615	7,199	88,349	2·5	·9
Assam ...	837	486	870	1,324	1,180	697	715	1,037	2,630	5,158	7,300	4,745	26,979	4·46	1·53
United Provinces of Agra and Oudh.	41	47	427	1,901	5,053	8,916	4,003	6,101	7,583	26,615	19,821	10,000	90,508	1·93	·69
Punjab ...	3	...	10	877	4,390	3,607	2,145	1,796	331	29	8	...	13,196	·68	·34
North-West Frontier Province.	...	...	...	28	325	154	24	91	148	100	61	1	932	·45	1·13
Central Provinces and Berar.	9	...	2	9	40	373	796	2,294	937	790	362	50	5,662	·41	1·46
Madras Presidency.	8,600	4,840	2,743	2,511	1,494	1,288	1,882	1,698	1,068	727	821	2,426	30,098	·8	1·7
Coorg ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay Presidency.	10	18	16	25	42	19	31	79	73	17	1	46	377	·02	·91
Burma {Lower...	125	280	248	497	505	631	771	835	1,396	942	1,138	841	8,209	1·34	·32
Burma {Upper...	1	...	4	4	1	2	151	1,153	2,804	2,599	2,009	660	9,388	2·52	·01
Ajmer-Merwara	...	...	...	1	...	2	...	...	...	...	...	...	3	·01	·02
Total ...	18,572	12,660	23,082	30,913	26,545	25,560	22,598	32,440	33,385	65,005	68,817	44,895	404,172	1·70	1·18

TABLE No. XXII.—*Details of the distribution and occurrence of Cholera during the year 1915.*

Province.	Mortality in 1915.	Mean mortality of previous 5 years.	Urban mortality.	Rural mortality.	Percentage of villages attacked.	Maximum mortality in any one district excluding towns.	Maximum mortality in any one town.	Month of maximum mortality.
Delhi	·22	·25	·36	·05	·33	...	...	April.
Bengal	2·88	1·98	2·35	2·91	14·80	5·94	14·67	April.
Bihar and Orissa	2·5	2·2	4·1	2·5	12·26	5·3	25·8	November.
Assam	4·46	2·70	3·15	4·48	1·90	10·86	12·74	November.
United Provinces of Agra and Oudh ...	1·93	1·41	1·38	1·97	6·29	11·68	15·43	October.
Punjab	·68	·18	·55	·70	5·07	3·13	20·41	May.
North-West Frontier Province ...	·45	·54	·76	·42	3·64	1·04	15·85	May.
Central Provinces and Berar ...	·41	1·14	·44	·40	2·67	1·40	8·67	August.
Madras Presidency	·8	1·4	·8	·7	9·72	2·1	11·6	January.
Coorg	...	·29	...	...	...	...	...	...
Bombay Presidency	·02	·99	·05	·01	·23	·14	4·83	August.
Burma {Lower	1·34	·53	1·78	1·27	7·02	4·36	21·18	September.
Burma {Upper	2·52	·21	5·68	2·23	11·07	4·33	12·40	September.
Ajmer-Merwara	·01	·03	...	...	·27	...	...	June.

TABLE No. XXIII.—*Small-pox mortality—1915.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	2	2,740	832	260	186	64	...	150	2,678	3	122	9	...	...	7,046
February	2	4,155	1,426	262	246	59	4	124	2,712	2	118	14	...	...	9,118
March	1	7,080	2,382	435	354	101	1	111	3,195	2	213	21	2	...	13,837
April	...	6,286	2,890	544	404	131	...	127	2,919	7	203	33	5	3	13,554
May	2	5,248	3,204	815	454	306	2	130	2,589	5	206	21	1	...	12,983
June	3	3,013	1,642	610	281	282	7	167	1,921	...	112	32	5	...	8,075
July	1	1,492	982	427	149	244	3	86	1,783	...	81	23	1	...	5,277
August	...	1,042	731	214	83	144	2	90	1,473	...	58	15	...	...	3,852
September	...	476	407	173	55	105	4	56	1,347	1	53	12	1	...	2,690
October	1	357	239	116	40	96	3	29	1,084	1	36	6	...	...	2,008
November	2	316	345	94	35	77	...	34	1,019	1	57	3	...	...	1,965
December	1	580	507	126	37	85	...	47	1,318	1	173	13	...	...	2,888
Total ...	14	32,785	15,526	4,076	2,304	1,694	26	1,151	24,038	23	1,425	202	15	3	83,282
B.—Annual death ratios :—															
Ratio per 1,000 of population, 1915.	·03	·72	·4	·67	·05	·09	·01	·08	·6	·13	·07	·03	·00	·01	·35
Ratio per 1,000 of population, 1914.	·10	·21	·2	·42	·38	·15	·16	·33	·7	·65	·21	·04	·00	·05	·32
Difference ...	—·07	+·51	+·2	+·25	—·33	—·06	—·15	—·25	—·1	—·52	—·14	—·01	...	—·04	+·03
Mean ratio 1,000 during 1910-14.	·39	·20	·1	·45	·13	·81	·54	·29	·5	·63	·30	·51	·20	1·83	·32
Difference ...	—·36	+·52	+·3	+·22	—·08	—·73	—·53	—·21	+·1	—·50	—·23	—·48	—·20	—1·82	+·03
II.—District mortality excluding towns :—															
Number of districts affected.	Not available.	26	21	8	38	27	2	19	24	4	18	9	3	Not available.	199
Highest district ratio ...		3·26	1·2	2·62	·72	·45	·03	·58	2·5	·35	·69	·10	·01		3·26
Name of that district ...		24 Parganas.	Balasore.	Kamrup.	Mirzapur.	Ferozepore.	Peshawar.	Drug.	Godavari.	Kiggatnad Taluk.	Kanara.	Akyab.	Mandalay		24 Parganas.
Lowest district ratio ...		·01	·01	·008	·01	·001	·01	·002	·1	·03	·00	·00	·00		·001
Name of that district ...		Jalpaigur	Angul.	Cachar.	Budaun.	Gujranwala.	Hazara.	Saugor.	Nilgiris.	Yedenalknad Taluk.	Kaira.	Amherst.	Yamethin		Gujranwala.
Number of districts without mortality.		...	...	...	10	1	3	3	...	1	8	11	9		44
District death rate per 1,000 of population.		·64	·4	·61	·05	·08	·01	·09	·6	·12	·05	·01	·00		·35*
III.—Town mortality:—															
Number of towns affected.	Not available.	100	45	11	41	42	1	21	132	2	21	11	5	Not available.	431
Highest town ratio ...		8·64	3·2	35·38	·76	1·73	·05	1·52	8·1	·54	6·81	·74	·37		35·38
Name of that town ...		Vishnupur.	Colgong.	Barpeta.	Brindaban	Ballabgarh.	Peshawar.	Nerpinglai.	Paiakollu.	Virajendrapet.	Malegaon	Kyonpyaw.	Yamethin		Barpeta.
Lowest town ratio ...		·04	·03	·16	·01	·03	...	·01	·03	·16	·01	·03	·01		·01
Name of that town ...		Rampur Bcalia.	Ranchi.	Gauhati.	Bareilly.	Lahore.	...	Jubbulpore.	Cannanore.	Mercara.	Hyderabad.	Moulmein	Mandalay		Mandalay
Number of towns without mortality.		12	10	9	52	97	12	89	137	...	91	28	15		552
Town death rate per 1,000 of population.		1·83	·5	3·49	·05	·12	·02	·08	·6	·30	·19	·16	·02		·53*
IV.—Infantile mortality :—															
Children under one year...	Not available.	1,560	3,135	1,001	801	379	7	435	8,799	...	353	7	1	...	16,478
Children 1—10 years ...		3,048	4,575	1,418	1,034	911	18	401	8,342	...	547	19	2	2	20,317
Percentage of children in total small-pox mortality.		14·06	49·66	59·35	79·64	76·15	96·15	72·03	71·31	...	63·16	12·87	20·00	66·67	44·18

* Excluding Delhi and Ajmer-Merwara.

TABLE No. XXIV.—*Fever mortality—1915.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I—Mortality by Provinces :—															
A.—Deaths by months—															
January	466	102,388	45,453	6,365	73,607	28,042	3,514	14,982	27,858	356	22,332	3,881	2,647	984	332,775
February	347	82,547	41,631	5,313	58,462	21,436	9,576	12,594	22,710	251	18,636	3,396	1,973	797	272,669
March	445	98,566	53,847	5,553	65,865	21,877	2,550	13,548	22,525	327	20,577	3,280	2,306	870	312,156
April	547	78,775	53,137	5,911	75,500	19,702	1,918	14,834	21,133	340	17,646	3,316	2,159	1,015	295,933
May	746	74,117	54,252	7,127	85,176	27,643	2,746	18,552	21,408	437	15,770	3,044	1,731	906	313,625
June	578	67,804	50,654	8,918	77,562	24,885	2,680	20,757	20,458	491	14,115	4,222	2,334	684	296,142
July	469	61,209	46,820	8,613	63,498	23,106	2,456	13,942	23,117	520	13,556	5,409	3,141	666	266,522
August	556	73,974	62,539	8,670	68,717	20,055	2,437	18,665	25,897	414	16,314	5,309	3,053	729	307,329
September	440	75,861	64,115	8,673	78,571	19,181	3,191	23,992	24,811	364	17,881	4,247	2,874	853	325,054
October	546	82,192	67,449	8,667	94,180	20,639	3,640	28,759	23,161	348	19,496	4,456	2,848	749	357,430
November	756	130,273	80,999	8,933	103,040	25,047	3,922	28,252	24,530	310	22,140	4,521	3,575	976	437,294
December	820	136,453	75,943	8,976	113,121	33,301	4,888	28,957	32,320	391	26,434	5,473	5,045	1,356	473,378
Total ...	6,716	1,064,159	696,839	91,739	957,299	284,784	36,518	237,834	290,328	4,549	224,797	50,554	33,686	10,585	3,990,287
B.—Annual death ratios —															
Ratio per 1,000 of population, 1915.	16·11	23·47	20·2	15·16	20·44	14·73	17·89	17·09	7·3	26·00	11·48	8·24	9·05	21·11	16·73
Ratio per 1,000 of population, 1914.	21·33	23·40	17·7	13·75	22·43	17·87	18·99	16·86	7·7	27·44	13·23	7·62	7·91	25·38	17·16
Difference ...	−5·22	+·07	+2·5	+1·41	−1·99	−3·14	−1·10	+·23	−·4	−1·44	−1·75	+·62	+1·14	−4·27	−·43
Mean ratio per 1,000 during 1910-14.	24·38	21·13	19·4	13·78	24·40	16·31	17·87	17·72	7·6	28·98	13 21	8·03	8·90	27·68	17·41
Difference ...	−8·27	+2·34	+·8	+1·38	−3·96	−1·58	+·02	−·63	−·3	−2·98	−1·73	+·21	+·15	−6·57	−·68
II.—District mortality excluding towns :—															
Number of districts affected.	Not available.	26	21	8	48	28	5	22	24	5	26	18	12	Not available.	243
Highest district ratio ...		40·02	27·9	30·30	45·10	20·35	21·14	27·18	21·9	34·11	18·19	14·68	17·48		45·10
Name of that district ...		Birbhum.	Purnea	Goalpara.	Bareilly	Muzaffar-garh.	Kohat	Damoh.	Vizagapa-tam.	Nanjaraj-Patna Taluk.	Ahmeda-bad.	Tharra-waddy.	Mandalay		Bareilly
Lowest district ratio ...		16·52	7·1	13·70	12·47	7·55	15·78	6·64	1·9	19·38	6·41	2·63	4·23		1·9
Name of that district ...		Howrah.	Puri	Sibsagar.	Banda	Simla.	Peshawar	Buldana.	Anauta-pur.	Yedenal-Knad Taluk.	Belgaum	Maubin.	Myingyan		Arantapur
Number of districts without mortality.		...	...	...	...	...	...	...	...	...	...	...	...		...
District death rate per 1,000 of population.		24·54	20·4	15·29	20·55	14·87	18·33	17·70	7·6	26·83	12·20	8·87	9·47		17·36*
III.—Town mortality :—															
Number of towns affected	Not available.	112	55	20	93	139	13	110	262	2	112	39	20	Not available.	977
Highest town ratio ...		30·33	39·4	39·75	52·12	30·12	40·76	24·73	16·2	9·13	43·25	15·83	6·98		2·12
Name of that town ...		Kotchand-pur.	Dumka	Mangal-dai.	Shirkot	Murree.	Nawa-shahr (Notified area).	Ratan-pur.	Mudu-gula.	Virajendra-pet.	Mirpur-khas	Tavoy.	Allanmyo,		Shirkot
Lowest town ratio ...		2·51	5·5	2·41	2·72	·40	6·68	·79	·1	8·14	·39	·42	·79		·1
Name of that town ...		Mymen-singh.	Madhu-bani.	Dhubri.	Hapur.	Rewari.	Kulachi.	Nawar-gaon.	Kollegal.	Mercara.	Ahmed-nagar Canton-ment.	Maubin,	Myingyan		Kollegal
Number of towns without mortality.		...	...	...	...	...	...	...	7	...	...	...	...		7
Town death rate per 1,000 of population.		7·94	12·8	8·46	18·64	13·32	13·61	11·00	4·5	12·22	7·75	3·88	4·60		9·5

*Excluding Delhi and Ajmer-Merwara.

TABLE No. XXV.—*Dysentery and Diarrhœa mortality—1915.*

Provinces, Districts, / Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces:—															
A.—Deaths by months:—															
January	18	2,843	2,687	1,014	940	760	32	2,412	6,620	10	2,140	435	116	15	19,542
February	12	2,314	1,942	682	702	596	14	1,883	5,093	8	1,795	398	74	12	15,435
March	16	2,502	2,771	731	985	668	11	2,068	4,767	8	1,936	453	111	32	17,059
April	27	2,311	2,807	749	1,533	893	18	2,423	4,072	7	2,099	457	118	52	17,563
May	27	2,177	2,419	933	1,980	1,722	82	2,490	4,237	8	2,008	575	103	56	18,814
June	16	1,725	2,253	1,094	1,773	1,519	48	2,702	4,436	15	2,283	955	260	43	19,172
July	22	1,722	2,668	1,164	1,817	1,009	43	2,742	5,187	6	2,475	1,152	543	27	20,577
August	28	1,977	3,615	1,491	2,354	976	41	3,340	6,621	16	4,229	1,073	611	44	28,416
September	32	2,096	3,284	1,732	2,093	951	43	7,766	5,728	12	4,188	776	535	59	29,234
October	25	2,420	2,923	2,208	1,795	1,060	74	7,160	4,605	8	3,335	552	402	36	26,603
November	15	3,325	2,997	2,266	1,779	1,305	46	5,162	4,363	8	2,639	683	311	29	24,951
December	28	3,607	3,134	2,058	1,728	1,099	31	3,974	5,278	6	2,583	650	243	45	24,464
Total ...	266	28,919	33,940	16,122	19,479	12,558	482	46,122	61,057	105	31,707	8,159	3,427	459	262,800
B.—Annual death ratios:—															
Ratio per 1,000 of population, 1915.	·63	·63	·9	2·66	·41	·65	·24	3·31	1·5	·60	1·62	1·33	·92	·92	1·10
Ratio per 1,000 of population, 1914.	·80	·66	·7	2·25	·39	·69	·22	3·45	1·9	1·01	2·19	·93	·63	·86	1·17
Difference ...	—·17	—·03	+·2	+·43	+·02	—·04	+·02	—·14	—·4	—·41	—·57	+·40	+·29	+·06	—·07
Mean ratio per 1,000 during 1910-14.	·66	·59	·8	2·37	·39	·57	·17	3·55	1·7	1·14	2·19	1·23	·64	1·04	1·13
Difference ...	—·03	+·04	+·1	+·29	+·02	+·08	+·07	—·24	—·2	—·14	—·57	+·10	+·28	—·12	—·03
II.—District mortality excluding towns:—															
Number of districts affected.	Not available.	26	21	8	48	28	5	22	24	5	26	18	12	Not available.	243
Highest district ratio ...		4·62	5·4	·60	7·82	4·04	·44	8·65	5·8	·45	3·66	2·66	2·24		8·65
Name of that district ...		Howrah.	Cuttack.	Lakhimpur.	Garhwal.	Rawalpindi.	Dera Ismail Khan.	Akola.	Nilgiris.	Padiankaad Taluk.	Sholapur.	Tavoy.	Pokokku.		Akola
Lowest district ratio ...		·01	·01	·40	·01	·02	·01	·68	·2	·16	·06	·63	·44		·01
Name of that district ...		Dinajpur.	Purnea.	Goalpara.	Kheri.	Hoshiarpur.	Kohat.	Balaghat.	Vizagapatam.	Yedenaiknad Taluk.	Larkhana.	Toungoo.	Kyaukse.		Kheri
Number of districts without mortality.		...	...	...	...	...	...	...	...	...	...	...	...		...
District death rate per 1,000 of population.		·49	·9	2·63	·21	·52	·18	3·28	1·3	·29	1·53	2·11	·77		·04*
III.—Town mortality:—															
Number of towns affected		112	53	20	88	128	11	108	256	2	108	37	20		943
Highest town ratio ...		7·10	10·7	21·40	8·05	17·63	1·62	15·50	9·3	8·62	14·06	5·17	4·42		21·40
Name of that town ...		Baranagar	Sambalpur.	Mangaldai.	Mau.	Murree.	Bannu.	Nerpinglai.	Coimbatore.	Vijayendrapet	Sholapur.	Zigon.	Allanmyo.		Mangaldai.
Lowest town ratio ...		·09	·09	·88	·09	·21	·18	·15	·1	3·99	·06	·44	·25		·1
Name of that town ...		Satkhira.	Giridih.	Gauhati.	Gangoh.	Sohdra.	Kohat.	Saoner.	Proddatur	Mercara.	Larkhana.	Shwedaung.	Pakokku.		Proddatur
Number of towns without mortality.		...	2	...	5	11	2	2	13	...	4	2	...		41
Town death rate per 1,000 of population.		2·68	2·8	4·07	3·24	1·91	·78	3·70	3·4	5·71	2·23	2·86	2·55		2·84*

*Excluding Delhi and Ajmer-Merwara.

TABLE No. XXVI.—*Plague mortality—1915.*

Province or State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total. 1915.	Total. 1914.
BRITISH PROVINCES.														
Delhi	1	...	2	4	1	...	...	...	...	...	...	...	8	13
Bengal	3	3	23	141	43	7	4	...	...	...	1	4	199	554
Bihar and Orissa...	2,196	4,802	9,928	6,629	1,398	99	15	50	136	106	416	1,466	27,241	64,334
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...	1
United Provinces of Agra and Oudh ...	4,889	9,548	17,797	16,607	3,749	134	30	65	191	340	1,116	3,662	58,128	103,954
Punjab...	13,890	27,057	51,628	83,251	43,176	3,276	235	20	7	44	162	170	223,066	64,010
North-West Frontier Province ...	...	...	8	90	198	43	1	...	...	...	...	...	340	166
Central Provinces and Berar ...	1,951	4,538	3,808	1,079	166	7	10	129	1,326	2,563	2,332	2,355	20,264	896
Madras Presidency	396	384	262	43	18	5	28	182	343	504	572	1,152	3,889	5,102
Coorg	...	...	...	...	...	...	...	...	...	...	1	1	2	10
Bombay Presidency	2,005	2,313	3,705	2,521	1,323	810	1,758	3,993	4,926	6,958	6,748	6,764	43,824	20,060
Burma {Lower	719	674	377	196	192	175	197	132	65	37	42	85	2,891	5,172
Burma {Upper	237	407	210	84	4	5	24	31	14	32	156	545	1,749	2,316
Ajmer-Merwara	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ... {1915 ...	26,287	49,726	87,798	109,615	50,268	4,561	2,302	4,602	7,008	10,584	11,546	16,204	380,501	...
Total ... {1914 ...	33,569	42,214	72,241	50,878	26,639	5,232	1,378	1,776	2,560	3,939	6,909	16,253	...	266,588
NATIVE STATES, ETC.														
Bengal Native States	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bihar and Orissa Native States ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam Native States	...	...	...	...	...	...	...	...	...	...	...	...	...	...
United Provinces of Agra and Oudh Native States.	25	101	263	496	246	29	4	...	...	...	...	6	1,170	835
Punjab Native States	1,413	2,580	3,811	6,131	7,218	705	99	8	9	...	3	47	22,024	9,560
Jammu and Kashmir States ...	73	183	383	525	1,016	269	...	...	...	...	42	68	2,559*	278*
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rajputana	2	3	21	79	14	13	...	...	...	...	1	1	134	1,159
Central India	135	256	317	144	12	...	...	52	121	498	575	541	2,651	2,285
Native States in Central Provinces ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay Presidency Native States ...	541	702	1,003	604	136	72	158	602	1,354	2,598	1,931	1,575	11,266	7,796
Burma Native States	...	6	6	4	4	9	21	16	8	12	7	...	93	8
Hyderabad State	134	397	259	313	56	8	...	471	679	1,137	1,753	4,076	9,223	2,771
Mysore...	462	526	326	126	43	91	70	194	286	393	455	575	3,547	4,613
Bangalore, Civil and Military Station...	77	97	83	51	13	9	40	69	56	69	69	65	698	735
Madras Native States	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Total ... {1915 ...	2,862	4,781	6,482	8,473	8,748	1,205	392	1,412	2,513	4,707	4,836	6,954	53,365	...
Total ... {1914 ...	2,153	2,359	3,314	4,090	3,518	1,089	352	1,484	3,138	3,351	2,486	2,901	...	30,035
Grand Total ... {1915 ...	29,149	54,507	94,280	118,088	59,016	5,766	2,694	6,014	9,521	15,291	16,382	23,158	433,866	...
Grand Total ... {1914 ...	35,722	44,573	75,555	57,968	30,157	6,321	1,730	3,260	5,698	7,290	9,395	19,154	...	296,623
Calcutta City	3	3	22	110	42	6	4	...	...	...	1	...	191	442
Bombay City	7	17	77	159	131	33	40	31	28	22	24	29	598	2,933
Madras City	...		...	...	...	...	...	...	...	...	...	...	...	2

* Jammu Province only.

TABLE No. XXVII.—*Mortality from Respiratory Diseases—1915.*

Provinces, Districts, Towns.	Delhi.	Bengal.	Bihar and Orissa.	Assam.	United Provinces of Agra and Oudh.	Punjab.	North-West Frontier Province.	Central Provinces and Berar.	Madras Presidency.	Coorg.	Bombay Presidency.	Lower Burma.	Upper Burma.	Ajmer-Merwara.	Registration India.
I.—Mortality by Provinces :—															
A.—Deaths by months—															
January	296	1,160	619	467	1,868	4,532	112	3,655	4,051	2	5,724	448	249	53	23,236
February	174	1,098	537	399	1,637	4,101	123	3,340	3,277	...	5,313	377	216	33	20,625
March	239	1,207	788	424	1,898	4,346	108	3,450	3,362	4	5,665	376	224	34	22,065
April	278	1,019	581	376	1,906	3,821	126	3,261	2,916	2	5,197	370	185	44	20,082
May	388	949	591	315	1,841	4,791	181	3,249	2 812	4	4,483	399	234	29	20,176
June	287	760	430	301	1,515	3,759	160	3,021	2,948	1	4,194	428	269	11	18,084
July	268	752	448	330	1,619	3,302	110	2,502	3,259	7	4,280	571	314	18	17,780
August	294	802	634	396	2,069	3,043	144	3,329	3,407	3	4,895	513	319	25	19,563
September	256	751	549	437	2,356	3,084	138	3,902	3,591	7	5,006	538	303	22	20,920
October	323	855	519	380	2,245	3,168	114	4,116	3,443	5	5,264	474	261	24	21,191
November	414	1,019	662	427	2,645	3,741	129	4,886	3,616	4	6,068	437	284	45	24,3777
December	437	1,381	757	480	2,637	5,505	156	5,444	4,314	5	7,275	474	266	64	29,222
Total ...	3,644	11,733	6,975	4,732	24,236	47,193	1,601	44,155	41,113	44	63,364	5,405	3,124	402	257,221
B.—Annual death ratios—															
Ratio per 1,000 of population, 1915.	8·74	·25	·2	·78	·52	2·94	·78	3·17	1·0	·25	3·23	·88	·84	·80	1·08
Ratio per 1,000 of population, 1914.	10·75	·27	·1	·66	·50	2·42	·78	3,20	1·1	·31	3·37	·84	·75	·66	1·09
Difference ...	—2·01	—·02	+·1	+·12	+·02	+·52	...	—·03	—·1	—·06	—·14	+·04	+·09	+·14	—·08
Mean ratio per 1,000 during 1910-1914.	9·11	·24	·1	·61	·47	2·26	7·6	3·04	1·0	·38	3·18	·85	·66	·65	1·02
Difference ...	—·37	+·01	+·1	+·17	+·05	+·18	+·02	+·13	...	—·13	+·05	+·03	+·18	+·15	+·06
II.—District mortality excluding towns:—															
Number of districts affected		26	21	8	48	27	5	22	24	1	26	18	12		238
Highest district ratio ...		·77	1·6	2·10	8·18	10·22	·88	9·96	2·6	·07	6·87	1·03	1·18		10·22
Name of that district ...		Howrah	Puri	Lakhimpur.	Hamirpur.	Gurdaspur.	Hazara	Jubbulpore.	Nilgiris	Padinalknad Taluk.	Kaira	Akyab	Shwebo		Gurdaspur.
Lowest district ratio ...		·003	·024	·07	·01	·16	·07	·33	·1	...	·08	·02	·06		·003
Name of that district ...		Noakhali	Purnea	Goalpara	Basti	Muzaffargarh.	Kohat	Balaghat	Ganjam	...	Larkhana	Toungoo	Myingyan		Noakhali.
Number of districts without mortality.		...	...	...	...	1	...	...	...	4	...	...	...		5
District death rate per 1,000 of population.		·08	·1	·76	·21	2·13	·46	2·92	·9	·01	2·58	·40	·28		·81*
III.—Town mortality :—															
Number of towns affected		110	45	17	86	139	13	108	233	1	108	35	20		905
Highest town ratio ...		6·67	3·0	6·11	17·78	19·49	7·13	17·02	8·0	6·70	14·12	11·24	26·09		19·19
Name of that town ...		Manikatala.	Sambalpur.	Mangaldai	Konch	Dalhousie	Peshawar	Jubbulpore.	Cochin	Mercara.	Kaira	Kyonpyaw.	Pyawbwe		Dalhousi
Lowest town ratio ...		·09	·08	·42	·05	·01	·65	·18	·03	...	·11	·16	·17		·01
Name of that town ...		Asansol	Deoghar	Moulvi Bazar.	Bahraich	Multan	Becket-gang: Khwajaganj (Notified Area.)	Mohpa	Tanjore	...	Dohad	Danubyu	Maymyo		Multan.
Number of towns without mortality.		2	10	3	7	...	...	2	46	1	4	4	...		
Town death rate per 1,000 of population.		2·86	·7	1·79	4·86	5·39	3·95	5·66	1·8	4·23	6·61	4·20	6·78		2·97*

Not available. Not available. Not available.

* Excluding Delhi and Ajmer-Merwara.

TABLE No. XXVIII.—*Vaccination.*

A.—*Total Primary Vaccinations and Re-vaccinations, successful cases among children, cost of the Special Vaccination Department, etc., during the official year 1915, 1916.*

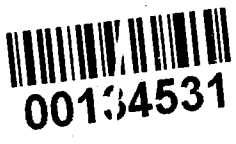
Province.	Number of operations performed by the Special and Dispensary Staffs combined.		Percentage of successful cases* to total operations.		Number of children successfully vaccinated by the Special and Dispensary Staffs combined.		Average number of persons vaccinated by each vaccinator of the Special Staff.	Total cost of the Special† Department.	Average cost of each successful case vaccinated by the Special Department.
	Primary.	Re-vaccination.	Primary.	Re-vaccination.	Under one year.	1 to 6 years.			
								Rs.	Rs. A. P.
Delhi	12,968	2,776	99·11	70·61	9,395	1,013	1,968	2,991	0 3 11
Bengal	1,261,921	369,697	98·09	67·16	375,948	703,111	1,078	195,942	0 2 1
Bihar and Orissa	1,217,591	70,828	99·46	64·81	626,323	545,807	1,097	112,336	0 1 5
Assam	273,573	38,825	96·63	62·29	60,147	165,877	961	51,442	0 3 1
United Provinces of Agra and Oudh.	1,523,656	104,711	97·34	74·46	1,018,254	406,673	1,829	214,659	0 2 0
Punjab	669,236	185,812	96·51	73·22	512,098	96,062	3,093‡	140,964	0 3 1
North-West Frontier Province ...	125,177	18,527	98·62	91·31	73,456	36,410	3,714§	15,352	0 1 10
Central Provinces and Berar ...	518,088	81,871	97·57	63·71	402,140	84,150	2,049	121,858	0 3 3
Madras	1,532,185	268,985	87·7	75·7	608,401	589,298	2,083‖	344,407**	0 3 9
Coorg	8,348	4,669	96·54	89·20	707	3,922	1,388	3,143	0 4 5
Bombay	719,960	70,965	98·91	55·83	530,771	116,296	1,701	362,735	0 8 8
Burma	395,597	78,462	97·14	57·65	118,028	188,256	1,546¶	220,475	0 9 1
Ajmere-Merwara	17,393	262	97·65	92·75	12,782	3,475	1,177	3,317	0 3 2
Total ...	8,275,693	1,296,390	95·33	66·80	4,348,450	2,940,350	1,554	1,789,621	0 3 5

* Excluding those the results of which were not known.
(†) Excluding Dispensaries.
(‡) Including vaccinations performed in Cantonments.
(§) Including vaccinations performed in Cantonments and Political Agencies.
(‖) Excludes average of work done by each medical subordinate.
(¶) Excluding the work done by private medical practitioners.
(**) Excluding Madras Presidency Circle.

B.—*Vaccination operations performed by the Special and Dispensary Establishments separately deaths from small-pox, etc., during the official year 1915-16.*

Province.	Population.	Number of operations (primary and re-vaccinations combined).			Ratio of successful vaccinations per 1,000 of population.	Percentage of annual estimated births at 40 per 1,000 of population successfully vaccinated.	Deaths from small-pox.*	
		By Special Department.	By Dispensary Staff.	Total.			Number.	Ratio per 1,000 of population.
Delhi	416,656	15,744	...	15,744	28·83	56·37	14	·03
Bengal	43,471,942†	1,517,551	114,067	1,631,618	32·00	21·62	32,785	·72
Bihar and Orissa	34,638,684	1,287,958	461	1,288,419	35·67	45·20	15,526	·4
Assam	7,059,857	310,715	1,683	312,398	41·51	21·30	4,076	·67
United Provinces of Agra and Oudh ...	46,820,556	1,628,183	184	1,628,367	32·81	54·37	2,304	·05
Punjab	19,566,432	852,477	2,571	855,048	37·16	65·43	1,694	·09
North-West Frontier Province ...	2,910,899	143,704	...	143,704	46·70	63·09	26	·01
Central Provinces and Berar ...	13,916,308	599,959	...	599,959	38·71	72·24	1,151	·08
Madras	41,473,139‡	1,801,029	141	1,801,170	35·4	36·67	24,038	·6
Coorg	174,976	12,707	310	13,017	67·45	10·10	23	·13
Bombay	22,643,744	782,837	8,088	790,925	29·78	58·60	1,425	·07
Burma	12,115,217	469,574	4,485	474,059	33·07	24·36	217	·02
Ajmer-Merwara	501,395	17,655	Not available.	17,655	33·44	63·73	3	·01
Total ...	245,709,805	9,440,093	131,990	9,572,083	34·21	44·24	83,282	·35

* For the Calendar year.
† Excludes 2,011,184 the population of other municipalities except Calcutta.
‡ Excludes the population of the cantonments of Bangalore and Secunderabad.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